FINAL

ENVIRONMENTAL ASSESSMENT
FOR
A FIGHTER DETACHMENT FACILITY

Shaw Air Force Base, South Carolina

April 2005

Report Documentation Page

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FINAL

FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT FOR A FIGHTER DETACHMENT FACILITY

SHAW AIR FORCE BASE, SOUTH CAROLINA

20th Fighter Wing
Air Combat Command

April 2005

FINAL

FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT FOR A FIGHTER DETACHMENT FACILITY SHAW AIR FORCE BASE, SOUTH CAROLINA

AGENCY: United States Air Force, Shaw Air Force Base, Sumter, South Carolina.

BACKGROUND: Pursuant to the National Environmental Policy Act (NEPA), as amended, the Council on Environmental Quality (CEQ) regulations implementing the act (40 CFR 1500-1508), Department of Defense (DoD) Directive 6050.1 [*Environmental Effects in the United States of DoD Actions* (30 July 1979)], and the current version of the Air Force *Environmental Impact Analysis Process (EIAP)* (32 CFR Part 989)] implementing these regulations, the 20th Fighter Wing at Shaw Air Force Base (AFB) has conducted an *Environmental Assessment for a Fighter Detachment Facility, Shaw Air Force Base, South Carolina*.

This action is needed to convert the temporary Fighter Detachment (FD) facilities at Shaw AFB to a permanent FD Facility in order to better fulfill the base's mission requirements. Air Combat Command has been tasked to make permanent several of the temporary FD sites established within its command, including the FD site at Shaw AFB.

DESCRIPTION OF PROPOSED ACTION: The Proposed Action for which this Environmental Assessment (EA) was prepared is the construction of a permanent FD Facility, which would replace the temporary FD facilities on the base. The self-contained facility would include a hangar with crew quarters and space for operations and support activities, as well as taxiways and aprons.

DESCRIPTION OF ALTERNATIVES: The Air Force EIAP, in compliance with the CEQ regulations, requires that, in addition to the Proposed Action (described above), the No-Action Alternative, and other reasonable alternatives be evaluated in the EA. Reasonable alternatives are those that "meet the underlying purpose and need for the proposed action and that would cause a reasonable person to inquire further before choosing a particular course of action" (32 CFR 989). Alternatives may be eliminated from detailed analysis based on operational, technical, or environmental standards that are applicable to the project. Although three alternatives were considered based on other possible locations on Shaw AFB for siting of the FD Facility, these alternatives did not meet the criteria for being reasonable; consequently, none were evaluated further in the EA. The No-Action Alternative is considered the only reasonable alternative to the Proposed Action.

Under the No-Action Alternative, there would be no construction of a permanent FD Facility as described in the Proposed Action. FD operations on Shaw AFB would continue using the temporary facilities currently in use, which consist of manufactured, modular quarters for the crew and fabric shelters for the aircraft located at the northwest end of the ramp and flight line.

crew and fabric shelters for the aircraft located at the northwest end of the ramp and flight line. However, under the No-Action Alternative, there would be no new construction, upgrades, or improvements of the temporary FD facilities. As a result, many of the FD facility requirements on which the specifications for the Proposed Action are based would remain unmet.

SUMMARY OF FINDINGS: This EA found that implementation of the Proposed Action would not result in significant adverse impacts on any environmental resource, including land use, infrastructure, socioeconomics and environmental justice, cultural resources, biological resources, water resources, air quality, hazardous materials and waste management, safety, and noise. Both direct and indirect effects were considered, and cumulative impacts from other ongoing and reasonably foreseeable future actions at the base were considered in conjunction with the Proposed Action. The Proposed Action would result in beneficial impacts on land use, socioeconomics, and safety. It would result in adverse impacts only on infrastructure, biological resources, and water resources. These adverse impacts would be relatively minor and, based on their context and intensity, none would be significant.

The No-Action Alternative would have adverse impacts on land use, biological resources, water resources, and safety. However, it was determined that these adverse impacts would be relatively minor and, based on their context and intensity, none would be significant.

The conclusion of the EA that implementation of the Proposed Action would not result in any significant adverse environmental impacts indicates that preparation of a Finding of No Significant Impact is appropriate for this action and that preparation of an Environmental Impact Statement (EIS) is not required.

CONCLUSION: Based upon my review of the facts and analyses contained in the EA, which is incorporated by reference herein, I conclude that the Proposed Action will not have a significant impact on the human environment. An EIS is not required for this action. This document and the supporting EA fulfill the requirements of NEPA, the CEQ regulations, and the Air Force EIAP.

Approved:

Michael O. Beale

MICHAEL O. BEALE, Colonel, USAF
Vice Commander

6 JUN 05

Date

FINAL

ENVIRONMENTAL ASSESSMENT

FOR

A FIGHTER DETACHMENT FACILITY

SHAW AIR FORCE BASE, SOUTH CAROLINA

20th Fighter Wing
Air Combat Command

April 2005

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LIST OF ACRONYMS

ACC	Air Combat Command
ACM	asbestos-containing material
AGE	Aerospace Ground Equipment
ADP	Area Development Plan
AF	Air Force
AFB	Air Force Base
AFI	Air Force Instruction
AFM	Air Force Manual
AFOSH	Air Force Occupational Safety and Health
AICUZ	Air Installation Compatible Use Zone
AMP	Asbestos Management Plan
ANG	Air National Guard
APZ	Accident Potential Zone
AST	above-ground storage tank
AT/FP	antiterrorism/force protection
B	building
BCP	Base Comprehensive Plan
BREC	Black River Electric Cooperative
BX	Base Exchange
CAA	Clean Air Act
CATEX	categorical exclusion
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CONUS	Continental United States
CP&L	Carolina Power and Light Company
CRMP	Cultural Resources Management Plan
CWA	Clean Water Act
dB	decibel
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DOL	Department of Labor
DOT	Department of Transportation
DRMO	Defense Reutilization and Marketing Office
EA	Environmental Assessment
ECR	Electronic Combat Range
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ERP	Environmental Restoration Program
ETSC	Endangered, Threatened, and Special Concern

LIST OF ACRONYMS (continued)

FD	Fighter detachment
FONSI	Finding of No Significant Impact
FS	Fighter Squadron
FW	Fighter Wing
FY	Fiscal Year
gpm	gallons per minute
HAP	Hazardous Air Pollutant
HUD	Housing and Urban Development
HWMP	Hazardous Waste Management Plan
HQ	Headquarters
IB	inhabited building
JCLUS	Joint Compatible Land Use Study
LBP	lead-based paint
Ldn	Day-Night Average Sound Level
mgd	million gallons per day
MILCON	Military Construction
MSL	mean sea level
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	non-point source
NRHP	National Register of Historic Places
O_3	ozone
O&M	Operations and Maintenance
ORW	Outstanding Resources Waters
Pb	lead
PM_{10}	particulate matter less than 10 microns in diameter
POL	petroleum, oil, and lubricant
PSD	Prevention of Significant Deterioration
Q-D	quantity-distance
RCRA	Resource Conservation and Recovery Act
ROI	region of influence
SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SF	square feet
SHPO	State Historic Preservation Office
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SO_2	sulfur dioxide
SWPPP	Stormwater Pollution Prevention Plan
TA	Transient Alert

LIST OF ACRONYMS (continued)

TAP	Toxic Air Pollutant
THPO	Tribal Historic Preservation Officer
TRS	Tactical Reconnaissance Squadron
TRW	Tactical Reconnaissance Wing
TSCA	Toxic Substances Control Act
TSD	treatment, storage, and disposal
US	United States
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USCENTAF	United States Central Command Air Forces
USFWS	United States Fish and Wildlife Service
UST	underground storage tank
VOC	volatile organic compound
WINDO	Wing Infrastructure Development Outlook
WWTP	Waste Water Treatment Plant

EXECUTIVE SUMMARY

This Environmental Assessment (EA) evaluates the resource impacts that would result from the construction of a Fighter Detachment (FD) Facility at Shaw Air Force Base (AFB), South Carolina. This EA has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality regulations implementing NEPA, and Air Force Instruction 32-7061, *The Environmental Impact Analysis Process*, as codified in Title 32, Code of Federal Regulations, Part 989.

PURPOSE AND NEED FOR ACTION

The purpose of the Proposed Action is to convert the temporary FD facility at Shaw AFB to a permanent FD Facility in order to better fulfill the base's mission requirements. Air Combat Command (ACC) has been tasked to make permanent several of the temporary FD sites established within its command, including the site at Shaw AFB.

The present FD at Shaw AFB is located in temporary facilities. This situation is not adequate for long-term support of the base's mission. The proposed FD Facility is required to support a set number of aircraft with additional spare aircraft, crews, and flight line-level maintenance activities on a continuous basis in a secure area.

PROPOSED ACTION AND ALTERNATIVES

The EA evaluates the impacts associated with the Proposed Action and the No-Action Alternative. NEPA and United States Air Force (USAF) guidelines require that, in addition to the Proposed Action and No-Action Alternative, other alternatives also are considered for evaluation.

Under the No-Action Alternative, there would be no construction of a permanent FD Facility as described in the Proposed Action. FD operations on Shaw AFB would continue utilizing the temporary facilities currently in use. The temporary facilities

consist of manufactured, modular quarters for the crew and fabric shelters for the aircraft. These temporary facilities are located at the northwest end of the ramp and flight line. Under the No-Action Alternative, there would be no new construction, upgrades, or improvements of the temporary FD facilities. As a result, many of the FD facility requirements on which the specifications for the Proposed Action are based would remain unmet. This alternative would limit the ability of Shaw AFB to perform certain aspects of its FD mission and to satisfy certain Department of Defense, USAF, and other requirements. The No-Action Alternative represents the status quo, that is, the baseline conditions that can be compared to conditions that would exist under the Proposed Action.

Other alternatives were considered based on the potential for the proposed facility to be constructed at locations on Shaw AFB other than the proposed location. During the evaluation of sites for the FD Facility, three other locations were identified on Shaw AFB where the facility potentially could be sited. These locations were determined not to be reasonable alternatives for siting of the proposed facility. No alternatives were identified that met the criteria for being reasonable alternatives to the Proposed Action.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

This EA evaluates the potential environmental consequences associated with the Proposed Action and the No-Action Alternative. Ten resource categories were addressed to identify potential impacts: land use, infrastructure, socioeconomics and environmental justice, cultural resources, biological resources, water, air quality, hazardous materials and waste management, safety, and noise. As indicated in Chapter 4, and summarized in Table 2-2, no potentially significant adverse impacts were identified for either the Proposed Action or the No-Action Alternative.

Land Use Resources. Under the No-Action Alternative, land uses on Shaw AFB would remain essentially the same as under existing conditions. Traffic flows entering/exiting the base and on the base would not change, and visual resources would not be adversely

affected. However, continuation of the FD mission from the temporary facility on the northwest ramp would have adverse effects on land use in that area of the ramp and flight line. Implementation of the Proposed Action would be consistent with base planning and, by allowing the temporary FD facility to be moved from the northwest ramp, would have a beneficial impact on land use in that area. The Proposed Action would not have significant adverse impacts on land use resources, including land use on the base, transportation, or visual resources.

Infrastructure. The No-Action Alternative would have a negligible impact on base infrastructure. The Proposed Action would place minor additional demands on some infrastructure components due to buildings to be constructed. The Proposed Action would add approximately 34,000 square feet (SF) of building area on the base, including the aircraft shelter, crew quarters, and associated buildings. The major utility systems on the base (electrical, potable water, wastewater, and natural gas) have extensive available capacity remaining. Thus, there would be no significant adverse impacts from the Proposed Action on the infrastructure systems and facilities of Shaw AFB.

Socioeconomics and Environmental Justice. The No-Action Alternative would cause no net change in the population or economy of the area. The Proposed Action would have minor beneficial socioeconomic impacts due to economic activity associated with construction of the FD Facility, which would provide short-term benefits to the local economy, and minor manpower increases associated with operation of the facility once construction is complete. These would provide a minor economic benefit to the Shaw AFB region. There would be no environmental justice issues associated with the Proposed Action or the No-Action Alternative.

Cultural Resources. Neither the Proposed Action nor the No-Action Alternative would impact known cultural resources on Shaw AFB, and there is only a minimal potential for the Proposed Action to impact undiscovered cultural resources as a result of excavation during construction activities. The Proposed Action would have no significant adverse impact on cultural resources.

Biological Resources. The consequences of the Proposed Action or the No-Action Alternative for the biological resources of Shaw AFB would not differ appreciably from existing conditions. Certain species may be impacted at a low level under the Proposed Action by effects from construction activities, such as land clearing for new construction, sedimentation, tree removal, or noise. However, evaluation of the context and intensity of these ecological effects indicates that they would not result in significant impacts on biological resources.

Water Resources. Under the No-Action Alternative, ongoing monitoring and permitting of wastewater and stormwater discharges to surface waters in the vicinity of the base would continue, and ongoing programs to prevent spills and other sources of groundwater contamination would continue. Consequently, there would be no significant adverse impacts to water resources under the No-Action Alternative. These conditions also would continue under the Proposed Action and, given that the proposed FD Facility would be located in a moderately developed area on the edge of the airfield, impacts on surface water resources from the Proposed Action would be minimal. Stormwater runoff and groundwater recharge in the vicinity potentially could be adversely affected by increases in impervious surface area. However, the increase in impervious surface area on the base would be relatively small, and stormwater management systems implemented in conjunction with the proposed projects would reduce any impacts on surface water quality or groundwater recharge.

Air Quality. Under the No-Action Alternative, the FD mission would continue using the temporary facility on the northwest ramp, the permanent FD Facility would not be constructed, and air emissions would remain the same as under existing conditions. Under the Proposed Action, operational emissions would not substantially change and, therefore, would not increase ambient concentrations of air pollutants in Sumter County. Functions performed at the FD Facility would replace functions currently being performed on the base at existing facilities. Consequently, air emissions associated with operation of the FD Facility under the Proposed Action would not have a significant adverse impact on air quality. Potential construction-related effects on air quality were

evaluated by modeling, which confirmed that the air quality effects of construction activities would be negligible both in the immediate vicinity of the base and in surrounding areas. Therefore, the effects of the Proposed Action would not result in significant adverse impacts on air quality.

Hazardous Materials and Waste Management. Under either the Proposed Action or the No-Action Alternative, management of hazardous materials and wastes on Shaw AFB would continue. Appreciable amounts of hazardous wastes are not anticipated to be generated during the operation and maintenance of the proposed FD Facility, and no significant adverse impacts associated with hazardous materials and waste management on Shaw AFB are expected. In addition, there are no hazardous waste sites in the immediate vicinity of the Proposed Action, so there would be no significant adverse effects associated with these sites.

Safety. Under the No-Action Alternative, there would be no net adverse effects on general operational safety and munitions safety on Shaw AFB, but minor adverse effects on security associated with the limitations of the temporary FD facility would continue. However, these effects would not be significant in the context of the overall beneficial impacts of the extensive security and safety programs and procedures employed on the base under existing conditions. Under the Proposed Action, general operational safety would not be appreciably impacted by construction-related hazards, munitions safety would continue as under existing conditions, and aviation safety would not be adversely affected. Force protection would be improved as a result of the increases in security that would result from construction of the FD Facility. Accordingly, the overall impact of the Proposed Action on safety at Shaw AFB would be beneficial.

Noise. Under the No-Action Alternative, the temporary FD mission would continue current operations, existing noise levels on and in the vicinity of Shaw AFB would remain the same as under current conditions, and there would be no significant adverse impact on the noise environment at Shaw AFB.

Under the Proposed Action, both operational noise and temporary construction noise were considered in assessing noise effects. The Proposed Action is not anticipated to create additional operational noise that would impact land uses adjacent to Shaw AFB. The Proposed Action would not alter the number or type of aircraft flown at the base, flight patterns or frequencies, or the AICUZ noise contours. Therefore, no land uses adjacent to Shaw AFB would be affected by daily operational noise resulting from the FD Facility. Noise from aircraft on the ground would increase in the vicinity of the facility in the southern part of the airfield. Construction methods for the building would incorporate noise reduction measures consistent with its use and its location within the 80-decibel noise contour on the base. Thus, operational noise associated with the Proposed Action would not have a significant adverse impact on the noise environment on or surrounding the base.

Temporary construction noise impacts are anticipated during the period of construction of the FD Facility. These impacts would be of relatively short duration and would be confined within the base boundaries. Temporary construction noise impacts were quantified using simplified modeling. Construction noise impacts associated with the Proposed Action would be temporary, would be relatively localized, and would not require noise attenuation. Thus, operational and temporary construction noise associated with the Proposed Action would not have a significant adverse impact on the noise environment at Shaw AFB.

Cumulative Effects and Irreversible and Irretrievable Commitment of Resources. The proposed FD Facility would represent an enhancement and expansion of existing FD facilities in an area of the base more conducive to the conduct of FD operations. This would result in fewer cumulative impacts than would occur under the No-Action Alternative, for which there would be cumulative impacts in conjunction with other operations in the northwestern area of the ramp and flight line. Given the limited area that would be occupied by the FD Facility, its discrete location, and its largely self-contained operations, the potential for significant cumulative impacts from the Proposed Action is small. Cumulative effects resulting from the Proposed Action in conjunction

with other past, present, and foreseeable future actions are anticipated to be minimal for all environmental resources. Cumulative effects from the Proposed Action in conjunction with ongoing operations and maintenance on the base were considered when evaluating the consequences for each resource, and it was concluded that cumulative adverse impacts would not be significant.

Irreversible and irretrievable commitments of resources would be similar under the Proposed Action and the No-Action Alternative in that both scenarios assume the continuation of Shaw AFB, its missions, and associated operations. Under the Proposed Action, construction of the FD Facility would involve additional irreversible and irretrievable commitments of natural resources, labor, materials, and fiscal resources beyond those that would occur under the No-Action Alternative. However, these incremental resource commitments would not be significant.

1.0 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

This Environmental Assessment (EA) evaluates the impacts of construction of a Fighter Detachment (FD) Facility at Shaw Air Force Base (AFB), South Carolina. This EA has been prepared to evaluate the potential environmental consequences of the Proposed Action and alternatives, in accordance with provisions of Title 32, Code of Federal Regulations, Part 989 (32 CFR 989) and Air Force Instruction (AFI) 32-7061, the *Environmental Impact Analysis Process (EIAP).*

1.2 BACKGROUND

Shaw AFB is located in the east-central part of South Carolina, approximately 35 miles east of Columbia, the state capital. The base, which covers an area of 3,354 acres, also is ten miles west of the center of the city of Sumter and within its city limits (Figure 1-1). The city of Sumter is within Sumter County, which is bounded by the Wateree River to the west and the Lynches River to the east. Outside the main population center in and around the city of Sumter, the county is covered mainly by a mixture of farmland, forests, and wetlands.

Shaw AFB also is responsible for the 12,400-acre Poinsett Electronic Combat Range (ECR), located approximately 15 miles south of the base between the towns of Wedgefield and Pinewood, and the Wateree Recreation Area, located approximately 35 miles northwest of the base. The Poinsett ECR is an auxiliary facility that provides a combat training environment for aircrews. The Wateree Recreation Area is an auxiliary facility that provides boating, camping, and picnic facilities on Lake Wateree. The Proposed Action being evaluated in this EA is located entirely on the main base. Consequently, the Poinsett ECR and Wateree Recreation Area are not considered further in this EA.

1.2.1 History

Shaw Field was officially established on August 30, 1941 and was named after 1st Lieutenant Ervin D. Shaw, a Sumter County resident who was killed in action during World War I. Shaw Field was one of the largest flying fields in the country, and its initial mission was to train pilots to fly. The first cadets arrived in December 1941 (SAFB 1999).

Following World War II, the 20th Fighter-Bomber Group arrived at Shaw Field with P-51 Mustang fighters. In 1948, Shaw Field was designated as an AFB and transferred to the Continental Air Command. Its aircraft were converted from the P-51 to the P-84 Thunderjet. Shaw was transferred to the Tactical Air Command in December 1950. The 363rd Tactical Reconnaissance Wing (TRW) transferred from Langley AFB, Virginia, on April 1, 1951 and doubled the activity at Shaw AFB. By November 1951, however, the 20th Fighter-Bomber Wing transferred to Langley AFB, and the 363rd TRW became the

parent wing at Shaw AFB. Headquarters 9th Air Force (AF) was assigned to Shaw from Pope AFB, North Carolina, in September 1954. The first RF-4C Phantom aircraft arrived at Shaw AFB in 1965, and shortly after, the 16th Tactical Reconnaissance Squadron (TRS) became the first combat ready RF-4C Squadron in the United States Air Force (USAF) (SAFB 1999 and 2004a).

The 363rd TRW was redesignated as the 363rd Tactical Fighter Wing in October 1981. The Wing received its first F-16 Fighting Falcon in March 1982. As part of the USAF reorganization in 1992, Shaw AFB became an Air Combat Command (ACC) installation. In January 1994, the 363rd and its four Fighter Squadrons (FS) (17th, 19th, 21st, and 309th) were redesignated as the 20th Fighter Wing (FW) with the 55th, 77th, 78th, and 79th FS. In 1996, the A/OA-10 Thunderbolt II aircraft and the personnel of the 55th FS were relocated to Pope AFB, North Carolina. However, the squadron itself did not move; instead, a fourth F-16 squadron was relocated to Shaw AFB and was designated the 55th FS (SAFB 1999).

In June 2003, the 78th FS was inactivated as part of the USAF's 2003 force structure changes, leaving Shaw AFB with three F-16CJ squadrons (55th, 77th, and 79th FS). Shaw AFB remains home to the largest combat F-16 wing in the USAF.

1.2.2 Military Mission

The 20th FW is the base host wing and operates the 55th, 77th, and 79th FS. The mission of the 20th FW is to "provide, project, and sustain combat-ready air forces" and "…execute directed missions designed to identify and destroy enemy forces, supplies, equipment, communications systems, and installations…within the design limits of the weapon system capabilities" (SAFB 1999). The aircraft operated by the 20th FW is the F-16CJ. The F-16CJ is a single-seat, multi-mission fighter with the ability to perform both air-to-air and air-to-ground roles. As host wing at Shaw AFB, the 20th FW retains the responsibility for providing facilities, personnel, and materiel for the operation of the base. The mission of Shaw AFB is to sustain the resources and relationships deemed appropriate to pursue national interests and provide for the command, control, and communications necessary to execute the missions of the USAF, ACC, 9th AF, and 20th FW.

Headquarters 9th AF is the major tenant at Shaw AFB. It exercises control over ten active duty ACC Wings in the continental United States (CONUS) as well as numerous Air Force Reserve and Air National Guard units. The 9th AF also maintains a continuous tactical control support system capable of providing direction to air elements and to direct-fire-support ground forces, and it provides a deployable combat intelligence capability in direct support of the Air Force Tactical Air Control System. The 9th AF also is the USAF component of Central Command, which is referred to as the United States Central Command Air Forces (USCENTAF) and is a major tenant at Shaw AFB. USCENTAF is responsible for fighter, bomber, tanker, airlift, and air control operations and training in the eastern United States (US), and it plans for and executes the

integration of joint US and multinational forces into coherent air operations in support of major theater war.

Other associate units/functions that Shaw AFB supports are (SAFB 1999):

- 682nd Air Support Operations Center Squadron;
- Detachment 718, Air Force Office of Special Investigation (AFOSI);
- Detachment 212, AFOSI;
- 337th Recruiting Squadron;
- Detachment 307, Field Training;
- Detachment QD 20, Area Defense Counsel;
- Defense Commissary Agency;
- Detachment 261, Air Force Audit Agency;
- Army Air Force Exchange Service;
- Defense Reutilization and Marketing Office (DRMO);
- Poinsett ECR.

1.3 PURPOSE AND NEED

The purpose of the Proposed Action is to convert the temporary FD facility at Shaw AFB to a permanent FD Facility in order to better fulfill the base's mission requirements (SAFB 2004b). ACC has been tasked to make permanent several of the temporary FD sites established within its command. The FD site at Shaw AFB is one of these (SAFB 2004b).

The present FD at Shaw AFB is located in temporary facilities consisting of manufactured, modular quarters for the crew and fabric shelters for the aircraft. This situation is not adequate for long-term support of the base's mission. The proposed FD Facility is required to support a set number of aircraft with additional spare aircraft, crews, and flight line-level maintenance activities on a continuous basis (SAFB 2004b).

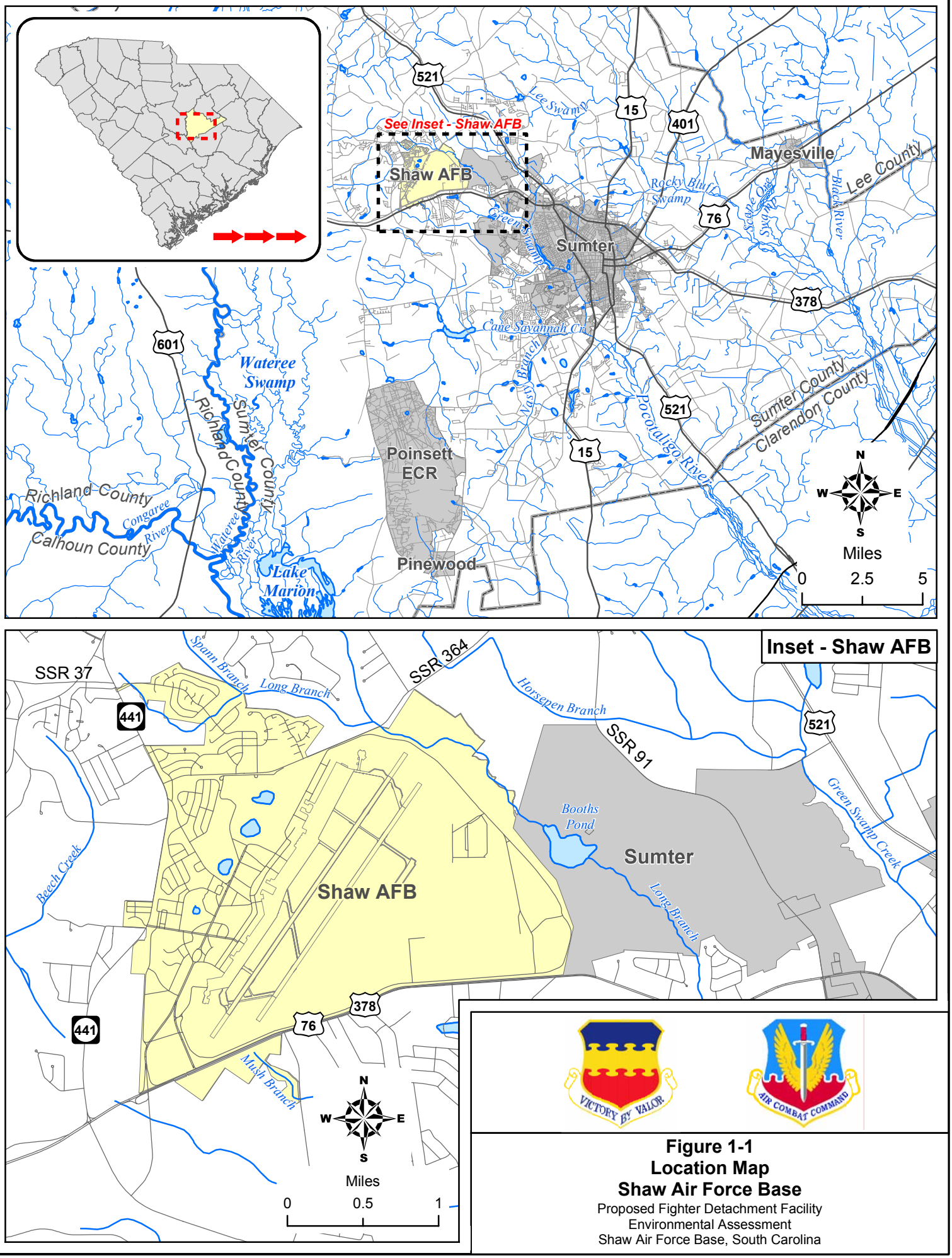


Figure 1-1
Location Map
Shaw Air Force Base
Proposed Fighter Detachment Facility
Environmental Assessment
Shaw Air Force Base, South Carolina

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This chapter describes the Proposed Action that is the subject of this EA, alternatives to the Proposed Action, and the environmental impact analysis process. It concludes with a section that compares the alternatives and summarizes the conclusions of the EA.

2.1 PROPOSED ACTION

Shaw AFB proposes to construct a FD Facility, which would convert the temporary FD facilities on the base to a permanent facility and sustain the military mission of Shaw AFB. The purpose and need for the FD Facility were identified in Section 1.3.

Facility Design

Under the Proposed Action, the FD Facility would be located in the crosswind runway area in the southeast area of the airfield (Figure 2-1). A separate, self-contained facility would be built over and adjacent to condemned concrete and asphalt pavements in an under-developed area southeast of Runway 04R and near the southern perimeter of the base. A 34,002 square feet (SF) hangar facility would be constructed to provide shelters for the detachment's aircraft, command and control space, brief/debrief rooms, planning/intel/classified space, life support, and crew quarters (SAFB 2004b).

A security fence would surround the facility. Taxiway extensions, a parking apron, an arm/de-arm pad, and a munitions haul route also would be constructed in conjunction with this self-contained operation. Existing pavements of the crosswinds runway would be retained and used for much of the taxiway extensions and apron, and an additional 280,141 SF of pavement would be installed for taxiways, aprons, shoulders, and other pavement facilities (SAFB 2004b).

Two existing facilities [Building (B)1981 and B1982] adjacent to the proposed site for the FD Facility would be evacuated due to safety implications and incompatible operations. These existing facilities would then be converted for use by the tenant maintenance unit assigned to the FD mission. One facility would be used for aerospace ground equipment (AGE) maintenance and storage. The other facility would be used for bench stock, consumables, cryogenics support, and offices. The existing functions in those facilities, including Disaster Preparedness, Civil Engineering Readiness, and Bare Base Training, would be relocated nearby to the Readiness Complex adjacent to Kingfisher Road and northeast of their current location. Three Operations and Maintenance (O&M) minor construction projects are being executed in FY04 and FY05 to beddown these relocated functions (SAFB 2004b).

The design of the proposed FD Facility at Shaw AFB would include the following features (SAFB 2004b):

- The facility would include aircraft shelters of sufficient size to accommodate the largest fighter aircraft in current and projected USAF inventory (e.g., F-15, F/A-22), with space on the apron for parking of additional aircraft.
- The facility would be designed for the aircraft to be loaded out with the following munitions: air-to-air missiles, multibarrel cannon, and chaff and flare countermeasures.
- The facility would be equipped with ventilation, heating, lighting, and lightning-protection systems, with an integral power and cooling air source to support aircraft maintenance activities.
- The facility would include an area of sufficient size to serve as an aircraft maintenance support section, including a "tool crib" and technical order library.
- The facility would include living/sleeping quarters and lavatory facilities for maintenance personnel, including munitions loading personnel.
- The facility would have a secure area capable of storing classified aircraft components.
- Utilities and other improvements associated with the facility would include underground electrical service, transformer, and emergency generator; 4-inch water supply line, 10-inch sewer line with small lift station, and 24-inch storm drain; boundary, area, entry point, parking, and special purpose lighting; edge and center taxiway lighting; airfield information signs and taxiway and apron markings; paved access roads, equipment areas, sidewalks, barriers, and parking; and fencing.

Facility Operations

The 20th FW at Shaw AFB has supported the FD mission using existing base infrastructure and personnel. The FD initially operated out of the transient aircraft facility located near the southwest end of the airfield, and transient aircraft were relocated to the ramp area roughly mid-field. Subsequently, new temporary FD facilities and aircraft shelters were installed near the engine test facility at the northwest end of the runway. An Air National Guard (ANG) unit currently is operating the FD (SAFB 2004b).

The flying operations component of the FD mission is not included as part of the Proposed Action. Construction and operation of a permanent FD Facility would entail negligible changes in the number of flying operations currently being conducted by the FD using the temporary facilities. Current FD flying operations constitute only 3 percent of the monthly flying operations conducted at Shaw AFB (Behr 2005). Therefore, facility operations evaluated in this EA address only those FD activities conducted on the ground.

Under the Proposed Action, Shaw AFB, as the host base, would provide the following in the form of a Host/Tenant Support Agreement: lodging and food service; operations support; munitions support; petroleum, oil, and lubricants (POL) support; AGE maintenance; command and control operations; and security forces augmentation. The tenant unit's aircraft maintenance squadron would be responsible for accomplishing all

major maintenance, preflight and basic postflight/throughflight inspections, and loading of the aircraft with live munitions. The flight line maintenance operation at the proposed facility would be self sufficient, with extensive back shop/off equipment support from the 20th FW. Based on the FD operational needs, the increase in base personnel estimated to be required under the Proposed Action would be approximately nine (SAFB 2004b).

2.2 METHODOLOGY FOR ALTERNATIVE IDENTIFICATION

The Air Force EIAP, in compliance with the Council on Environmental Quality (CEQ) regulations, requires that, in addition to the Proposed Action, the No-Action Alternative and all other reasonable alternatives be evaluated in the EA. Reasonable alternatives are those that "meet the underlying purpose and need for the Proposed Action and that would cause a reasonable person to inquire further before choosing a particular course of action" (32 CFR 989). Alternatives may be eliminated from detailed analysis based on operational, technical, or environmental standards that are applicable to the project.

For example, the ability of an alternative to satisfy the operational and technical objectives of the project is a principal determinant of whether the alternative is reasonable. Any alternative, other than the No-Action Alternative, that does not satisfy the purpose and need for the Proposed Action is rejected as a reasonable alternative. Also critical is the ability of an alternative to meet established environmental protection standards or regulatory or public expectations of environmental protection. Any alternative likely to cause a significant, non-mitigable environmental impact that would result in regulatory or public opposition is not considered a reasonable alternative and is not evaluated further (32 CFR 989).

2.3 ALTERNATIVES TO THE PROPOSED ACTION

NEPA and USAF guidelines require that, in addition to the Proposed Action and No-Action Alternative, other alternatives be considered for evaluation. The No-Action Alternative is described in Section 2.4. Other alternatives were considered based on the potential for the proposed facility to be constructed at locations other than the proposed location. During the evaluation of sites for the FD Facility, three other locations were identified on Shaw AFB where the facility potentially could be sited. These locations were determined not to be reasonable alternatives for siting of the Proposed Facility. These sites and the reasons they were not carried forward in the EA are described in Section 2.5. No alternatives were identified that met the criteria for being reasonable alternatives to the Proposed Action.

2.4 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, there would be no construction of a permanent FD Facility as described in the Proposed Action, and operations would continue using the temporary facilities currently in use. The temporary facilities consist of manufactured, modular quarters for the crew and fabric shelters for the aircraft. These temporary

facilities are located at the northwest end of the ramp and flight line (Figure 2-1). This situation is not adequate for long-term support of the Shaw AFB mission (SAFB 2004b).

Deficiencies associated with the location of the temporary FD facilities involve space limitations, operational conflicts, and security issues. There currently is limited space available for the temporary FD facilities in the northwest ramp area. A new squadron operations facility is needed in this area, which would further limit space for the FD facilities. Current aircraft parking also will be shifted north into this area due to the operational restructuring of the squadrons on the base, and the standoff required for aircraft wingtip clearance would close additional ramp space to the FD operations. Siting of the temporary facility in this area complicates aircraft operations due to the mix of the FD's continuous operations with the existing flying operations in this area (SAFB 2004b).

Under the No-Action Alternative, there would be no new construction, upgrades, or improvements of the temporary FD facilities. As a result, many of the FD facility requirements on which the specifications for the Proposed Action are based would remain unmet. This alternative would limit the ability of Shaw AFB to satisfy certain Department of Defense (DoD), USAF, and other requirements. The No-Action Alternative represents the status quo, that is, the baseline conditions that can be compared to conditions that would exist under the Proposed Action.

2.5 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

Selection of alternatives for evaluation in this EA was based on criteria described in Section 2.2 for determining whether a potential alternative is reasonable (e.g., the ability to meet project objectives). As discussed in Section 2.3, no reasonable alternatives to the Proposed Action were identified or carried forward in the EA process. However, three alternatives were considered based on other possible locations on Shaw AFB for construction of the FD Facility.

2.5.1 Southwest Ramp Location

Location of the FD Facility on the ramp at the southwest end of the flight line near B106 would provide immediate access to runway 04R/04L. This location also would allow quick reaction times from emergency response teams (fire, crew egress, and external security) and would be in close proximity to backshop maintenance. However, there are many negative factors affecting this location, as discussed below (SAFB 2004b).

This area currently supports operations of the 55th FS. To make room for the FD Facility, the 55th FS would have to relocate to the northwest ramp, which is already crowded. In addition, the continuous operations of the FD Facility would be incompatible with the existing flying operations in this area of the flight line (SAFB 2004b).

There is a lack of vacant property in this area of the southwest ramp. Construction in this area is restricted by a USAF-mandated Building Restriction Line, which runs along the entire edge of the apron and requires a clearance of 125 feet from the edge of the apron. Construction south of the existing ramp is prohibited by the runway Clear Zones (see Section 3.9.3). Thus, in order to make room for the FD Facility, a prohibitive number of existing facilities would have to be demolished (SAFB 2004b).

The aircraft associated with the FD Facility would be surrounded by a munitions safety quantity-distance (Q-D) zone (see Section 3.9.2) that would overlap existing facilities and impact their operations (SAFB 2004b).

2.5.2 Transient Alert (TA) Ramp Location

Siting of the FD Facility at the TA Ramp location would place it near the south end of the flight line on the parking apron near hangar B611, approximately 1,400 feet northeast of the southwest ramp alternative location. This location would allow quick reaction times from emergency response teams (fire, crew egress, and external security) and would be in close proximity to backshop maintenance (SAFB 2004b). However, there are many negative factors affecting this location, as discussed below.

There is a lack of vacant property in the area of the TA Ramp. Thus, in order to make room for the FD Facility, existing facilities would have to be demolished. Demolition is not an option because the existing facilities support critical base functions (SAFB 2004b).

Several of the existing facilities in this area have waivers of the 1,000-foot runway-to-building setback. The FD Facility would require an additional waiver, which is not a desirable option for aviation safety (SAFB 2004b).

The aircraft associated with the FD Facility would be surrounded by a munitions safety Q-D zone (see Section 3.9.2) that would overlap existing facilities and impact their operations (SAFB 2004b).

In addition, the continuous operations of the FD Facility would be incompatible with the existing flying operations in this area of the flight line (SAFB 2004b).

2.5.3 Northwest Ramp Location

This location is the current location of the temporary FD facilities, as described for the No-Action Alternative in Section 2.4. Siting of the permanent FD Facility at the northwest ramp location would place it at the northwest end of the flight line near the parking apron north of B1610. This area is approved for munitions safety, and there is no runway-to-building setback limitation that would affect the location of the facility. This location also would allow immediate access to runway 22R/22L and would be in close proximity to backshop maintenance (SAFB 2004b). However, there are several negative factors affecting this location, as discussed below.

There is minimal property in this area available to be used for the FD Facility. A new squadron operations facility also is needed in the northwest ramp area, and current aircraft parking will be shifted north into this area due to the operational restructuring of the squadrons on the base. The standoff required for aircraft wingtip clearance would close additional ramp space. Siting of the proposed facility in this area also would cause operational complications due to the mix of the FD's continuous operations with the existing flying operations in this area (SAFB 2004b).

2.5.4 Summary of Alternatives Considered

Three alternatives to the Proposed Action were considered based on alternative siting options on Shaw AFB: a southwest ramp location, a TA ramp location, and a northwest ramp location. The proposed construction of the FD Facility in the crosswind runway location addresses and meets the specific requirements of the FD; the alternative siting locations do not. There would be multiple problems associated with each of the alternative locations if the FD Facility were constructed and operated in these areas. If the project were not sited at the crosswind runway location in accordance with the Proposed Action, then project objectives would not be met. Consequently, the three alternatives considered above are not reasonable alternatives to the Proposed Action and are not carried forward in this EA.

2.6 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

2.6.1 Public and Agency Involvement

The draft of this EA was submitted to the South Carolina State Clearinghouse for distribution and review by appropriate state and local agencies. In addition, copies of the Draft EA were sent directly to the South Carolina Department of Natural Resources (SCDNR), South Carolina Department of Health and Environmental Control (SCDHEC), City of Sumter, County of Sumter, and Catawba Indian Nation Tribal Historic Preservation Officer (THPO). Copies were also provided to the South Carolina State Historic Preservation Office (SHPO) for consultation regarding cultural resources and to the US Fish and Wildlife Service (USFWS) for consultation regarding biological resources (primarily for compliance with the Endangered Species Act). Appendix A contains copies of the consultation letters that accompanied the Draft EA when it was sent by Shaw AFB to these agencies and governments.

Shaw AFB published a newspaper advertisement in the February 20, 2005 edition of *The Item* announcing the availability of the Draft EA for public review at the Sumter County Library in Sumter, South Carolina. The public comment period extended from February 22 through March 23, 2005.

No comments were received from the public. Copies of responses received from state, federal, and tribal agencies are provided in Appendix A. The agencies from which responses were received are the USFWS, SHPO, SCDNR, SCDHEC, State Clearinghouse, and Catawba THPO. The USFWS, SHPO, and SCDNR concurred with

the conclusions of this EA that the Proposed Action would not have adverse impacts on resources under their jurisdiction (i.e., threatened or endangered species, historic properties, and natural resources, respectively). The SCDHEC response did not comment on the conclusions of the EA but noted that necessary environmental permits for the Proposed Action must be obtained in accordance with applicable state and federal regulations. The State Clearinghouse response stated that an intergovernmental review was conducted; however, no comments were provided, indicating that none were received from the state agencies included in the review. The Catawba THPO acknowledged receipt of the Draft EA but did not provide any comments.

2.6.2 Regulatory Compliance

2.6.2.1 NEPA Regulations

NEPA (Public Law 91-190; Title 42, US Code, Section 4321-4347 [42 USC 4321-4347]) requires all agencies of the federal government to consider the environmental consequences of proposed major federal actions and to include these considerations in the decision-making process. Title II of NEPA created the CEQ to implement federal policy under NEPA. In 1978 the CEQ issued *Regulations For Implementing The Procedural Provisions Of The National Environmental Policy Act* (40 CFR 1500-1508), referred to as the CEQ Regulations.

The Department of the Air Force directed adherence to NEPA requirements in Air Force Policy Directive 32-70, *Environmental Quality*. This directive was implemented in 32 CFR 989, EIAP. This regulation provides instructions on procedures to achieve and maintain compliance with NEPA and the CEQ Regulations in conjunction with the Air Force EIAP. It establishes policy, responsibilities, and procedures for integrating environmental considerations into Air Force planning and decision-making and for assessing the environmental effects of Air Force actions.

According to the CEQ Regulations and the Air Force EIAP, the purpose of an EA is to provide evidence and analysis sufficient to determine whether the Proposed Action may have significant effects that would require the preparation of an *Environmental Impact Statement* (EIS). If the assessment determines that the environmental effects will not be significant, a *Finding of No Significant Impact* (FONSI) is prepared. The EA aids the Air Force in complying with NEPA when an EIS is not required.

2.6.2.2 Additional Regulatory Requirements

Federal, state, and local authorities have promulgated additional regulatory requirements potentially relevant to the Proposed Action.

Federal

Air Quality

The Clean Air Act (CAA) establishes federal policy to protect and enhance the quality of the nation's air resources to protect human health and the environment. The CAA requires that adequate steps be implemented to control the release of air pollutants and prevent significant deterioration of air quality. The 1990 amendments to the CAA require federal agencies to determine the conformity of Proposed Actions to the State Implementation Plans (SIP) for attainment of air quality goals. The SCDHEC Bureau of Air Quality, in commenting on the Draft EA, stated that Sumter County currently meets all national ambient air quality standards; therefore, the Proposed Action is not subject to a conformity analysis (see Appendix A).

Water Resources

The Clean Water Act (CWA) of 1977 (33 USC 1344) and the Water Quality Act of 1987 (33 USC 1251, as amended) establish federal policy to restore and maintain the chemical, physical, and biological integrity of the nation's waters and, where attainable, to achieve a level of water quality that provides for the protection and propagation of fish, shellfish, wildlife, and recreation in and on the water. The US Army Corps of Engineers (USACE) is the agency authorized to grant permits for impacts to the nation's waters.

Executive Order (EO) 11990, Protection of Wetlands, requires that federal agencies provide leadership and take actions to minimize or avoid the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.

Hazardous Material and Wastes

Hazardous materials and wastes are subject to regulation under the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); The Toxic Substances Control Act (TSCA); the CWA; and the CAA.

Biological Resources

The Endangered Species Act of 1973 (16 USC 1531) requires that federal agencies, in consultation with the USFWS and the National Marine Fisheries Service, use their authority to assist in carrying out federal programs for the conservation of threatened or endangered species. These agencies also ensure that any project that is funded, authorized, or constructed by the federal government is not likely to jeopardize the continued existence of such threatened or endangered species, or result in the destruction or adverse modification of their habitat. The USFWS reviewed the Draft EA and concurred that the Proposed Action is not likely to have reasonably foreseeable adverse

effects on resources under their jurisdiction that are currently protected by the Endangered Species Act (see Appendix A).

Cultural Resources

Actions that could affect cultural resources are regulated under Section 106 of the National Historic Preservation Act of 1966 and the Advisory Council on Historic Preservation's Regulations for compliance with Section 106 codified as 36 CFR 800. These regulations require that the effects of federal actions on cultural resources be considered and minimized. The SHPO, which is responsible under the Act and regulations for preservation of cultural resources in South Carolina, concurred that cultural resources will not be affected by the Proposed Action (see Appendix A).

State and Local

Soils

The Stormwater Management and Sediment Reduction Act of 1991 was enacted to reduce the adverse effects of stormwater runoff and sediment and to safeguard property and the public welfare by strengthening and making uniform the existing stormwater management and sediment control program. The Act promulgated regulations (R.72-300) that apply to land-disturbing activities on all lands except state-owned lands. This program is administered by the SCDHEC, Bureau of Water.

Hazardous Materials and Wastes

Under the "Underground Storage Tank (UST) Control Regulations" (R.61-92), SCDHEC, Bureau of Land and Waste Management, notification of various activities regarding USTs is required.

Hazardous materials and wastes are regulated under the RCRA and the South Carolina Hazardous Waste Management Act. The SCDHEC, Bureau of Land and Waste Management, issues permits that identify and specify wastes and associated management practices that may be handled in accordance with the South Carolina Hazardous Waste Management Regulations (R.61-79).

Building demolition or renovation projects may disturb asbestos-containing materials. Such disturbances can result in the production of asbestos-containing dust that may contaminate a structure and are regulated by the SCDHEC, Bureau of Air Quality/Asbestos Section. Regulations pertinent to renovation and demolition activities include federal procedures (40 CFR 763) and SCDHEC regulation 61-86.1. SCDHEC adopted the National Emission Standards for Hazardous Air Pollutants (NESHAP) relating to asbestos demolition and renovation by reference. These requirements may be found at 40 CFR 61, Subpart M – National Emission Standard for Asbestos (40 CFR 61-141-157).

Water Resources

The Watershed Water Quality Management Strategy was implemented in 1991 by SCDHEC to protect and improve South Carolina's surface water resources. The management strategy coordinates monitoring, assessment, water quality modeling, planning, permitting, and other SCDHEC initiatives by basin. Shaw AFB is located within the Catawba and Santee Basins.

The Clean Water Act of 1972 initiated strict control of wastewater discharges, with responsibility for enforcement given to the US Environmental Protection Agency (EPA). The EPA then created the National Pollutant Discharge Elimination System (NPDES) to track and control point sources of pollution. The primary method of control is by issuing permits to dischargers with limitations on wastewater flow and constituents. The EPA delegated permitting authority to the State of South Carolina, which permits stormwater discharges under Regulation 61-9.

Section 401 of the CWA requires each state to certify that state water quality standards will not be violated for activities that either involve issuance of a federal permit or license, or require discharges to Waters of the United States. The USACE cannot issue a Section 404 permit until a 401 certification is issued. This certification is issued by the SCDHEC, Bureau of Water.

Biological Resources

Animals with a state designation of endangered or threatened are granted legal protection by the state of South Carolina, based on the South Carolina Nongame and Endangered Species Conservation Act (Title 50, Chapter 15 of the 1976 South Carolina Code of Laws updated through the 2003 Session of the General Assembly). SCDNR reviewed the Draft EA and commented that the Proposed Action can be accomplished with minimal impacts to natural resources.

2.6.3 Permit Requirements

This EA has been prepared in compliance with NEPA; other federal statutes, such as the CAA and the CWA; EOs; and applicable state statutes and regulations. Table 2-1 summarizes existing federal, state, and local permits and the potential for change to these permits due to the Proposed Action as well as new permits that may be required for the Proposed Action.

Table 2-1. Environmental Permitting for the FD Facility

Resource Permit [1]	**Proposed Action**
Air Construction	X
Wastewater Shaw AFB NPDES Wastewater Treatment	X
Drinking Water Construction	X
Storm Water Construction[2]	X
Storm Water Pollution Prevention Plan Sedimentation and Erosion Control Shaw AFB NPDES Storm Water	 X O

Note:
1 = No change would be needed for the following permits:
- Air: Title V Operating
- Water: Shaw AFB Drinking Water
- Wastewater: Wateree NPDES Wastewater
  Shaw AFB Non-Discharge (Sludge Disposal)
  Septic Tanks at Shaw
- Hazardous Waste: Shaw AFB Hazardous Waste Permit
- USTs: UST Registration Certification
  UST Monitoring Well

2 = Permit for construction sites disturbing more than 1 acre
X = New permit needed
O = Permit change potentially needed

During the course of this EA, a list of existing Shaw AFB permits was compiled and reviewed. In addition to this EA being prepared for the decision maker and the interested public, it is also a tool for Air Force personnel to ensure compliance with all regulatory requirements from proposal through project implementation.

2.7 COMPARISON OF ALTERNATIVES

The purpose of this section is to summarize and compare the environmental impacts of each alternative, thereby defining the issues and providing a clear basis for choice among the alternatives by the decision-maker. The environmental resources potentially affected by the alternatives are described in Chapter 3, Affected Environment. The consequences for each of these environmental resources from the implementation of each alternative are described in Chapter 4, Environmental Consequences. The present section discusses and provides a tabular matrix (Table 2-2) that summarizes the conclusions reached in Chapter 4.

In Chapter 4, impacts on each environmental component are evaluated to determine whether the impact would be beneficial or adverse. For adverse impacts, the level of impact on the resource is estimated (e.g., negligible, low, moderate, high) and considered in conjunction with the context (e.g., local versus regional, short-term versus long-term) and intensity (based on ten criteria provided in the CEQ Regulations) of the effect in determining whether the impact is significant. The conclusions of the evaluation are summarized in Table 2-2. As shown in the table, no potentially significant adverse impacts were identified for either the Proposed Action or the No-Action Alternative.

It is the conclusion of this EA that implementation of the Proposed Action would not result in a significant adverse effect on the human environment. Therefore, preparation of a FONSI is appropriate for this action, and preparation of an EIS is not required.

Table 2-2. Summary of Potential Environmental Consequences

Resources	***Proposed Action***	***No-Action Alternative***
Land Use / Transportation	+ / ○	– / ○
Infrastructure	–	○
Socioeconomics / Environmental Justice	+ / ○	○ / ○
Cultural Resources	○	○
Biological Resources	–	–
Water Resources	–	–
Air Quality	○	○
Hazardous Materials and Waste Management	○	○
Safety	+	–
Noise	○	○

Consequences:
○ = No net change.
+ = Beneficial or not discernible.
– = Adverse but not significant.

Figure 2-1
Aerial Photo of Shaw AFB
Showing Fighter Detachment Locations

Proposed Fighter Detachment Facility
Environmental Assessment
Shaw Air Force Base, South Carolina

3.0 AFFECTED ENVIRONMENT

This chapter describes the existing environment in the area potentially affected by the Proposed Action. The environment is described based on those component resources that are relevant to the assessment of impacts from the Proposed Action. These resources and the order of their discussion are as follows: land use resources, infrastructure, socioeconomics and environmental justice, cultural resources, biological resources, water resources, air quality, hazardous materials and waste management, safety, and noise. The effects of the Proposed Action and the No-Action Alternative on the baseline conditions of each environmental resource are evaluated in Chapter 4, Environmental Consequences.

3.1 LAND USE RESOURCES

Land use resources include land use, transportation, and visual resources. Land use focuses on the existing and planned future land uses on Shaw AFB and in surrounding areas. Transportation includes the road and rail networks providing access between the local community and the base, as well as within the base. Visual resources include any natural or human-modified features on-base or within view from the base that contribute to the aesthetic qualities of the base.

3.1.1 Land Use

Shaw AFB occupies 16,718 acres of federally owned or leased land in Sumter County (Figure 1-1). The main cantonment area of Shaw AFB encompasses 3,354 acres and is located within the western boundary of the city of Sumter, approximately 10 miles west of the downtown area (SAFB 1999). Poinsett ECR, which covers 13,364 acres, is an auxiliary facility of Shaw AFB. The range is located 15 miles south of the base (SCCPC 1994). Another auxiliary facility, the Wateree Recreation Area, covers 24 acres along Lake Wateree in Kershaw County and is located 37 miles northwest of the main base. Poinsett ECR and Wateree Recreation Area auxiliary facilities are not addressed in this EA.

The southern boundary of the base is bordered by a major commercial business and retail corridor along US Highway 76/378 (US 76/378) (SAFB 1999). There is also a mining operation to the south of the base (SCCPC 1994). The western boundary of the base is bordered by State Route 441 (SR 441), another commercial corridor highway, and housing ranging from low to high density (SAFB 1999). The northern and eastern boundaries are adjoined by high-density residential and agricultural uses. Along the eastern border of the base, there are privately owned farmland and undeveloped woodland (SCCPC 1994). Figure 3-1 depicts existing land use adjacent to Shaw AFB.

The existing land uses on Shaw AFB are illustrated in Figure 3-2 (SAFB 1999). The airfield and aircraft operations and maintenance facilities, which together account for nearly 40 percent of the total base area, are located approximately in the center of the base, and bisect the middle of the installation in a northeast-southwest direction. The majority of the remaining developed land uses are located north and west of the airfield.

The east side of the base has much less development and contains the majority of the open space.

Most administration areas are located in the core of the developed area of the base (west of the airfield), as are most of the community support areas, the medical complex, and the unaccompanied housing. The accompanied housing and public schools are located in the northwest portion of the base. A 150-acre golf course is situated between the residential area and the flight line, and there are other outdoor recreation areas on the west and east sides of the base. Industrial areas are concentrated in the southwest corner of the installation and on the east side of the base (including a munitions storage area). The majority of the undeveloped land (open space) is on the east side of the base, southeast of the airfield. Overall, open space occupies approximately 25 percent of the base land area (SAFB, 1999).

3.1.1.1 Airfield

The airfield is located approximately in the center of the base, between the main cantonment area to the west and the munitions storage area to the east. The airfield consists of two parallel runways aligned in a northeast-southwest direction. Runway 04L/22R is 10,000 feet long and 150 feet wide, and Runway 04R/22L is 8,000 feet long and 150 feet wide. Each runway has paved overruns 1,000 feet in length at both ends. The airfield also has seven taxiways and three aircraft parking ramps. The control tower is located along the western edge of the airfield at the center of the runways. Vacant parking space is available on the eastern side of the airfield to support expansion of the flying mission or increases in aircraft. This expansion could include a larger hot cargo pad, a new aircraft parking ramp, additional taxiways, and additional facilities for aircraft operations and maintenance.

There are several operational and built constraints necessary for airfield operations that affect land use. These constraints are designed to maintain flying safety and limit the exposure of personnel and facilities to danger. Restrictions include protecting aircraft from obstacles near the flight line (airfield clearance criteria), protecting personnel from harmful noise levels created from aircraft during take-off and landing (noise contours), and storing explosives safe distances from inhabited buildings and other locations with personnel.

Airfield clearance criteria are defined by Air Force Regulations to control the location and height of structures in the vicinity of the airfield. These criteria are identified as imaginary surfaces (planes and conical surfaces) that extend above and away from the airfield to protect the spaces within which aircraft operate (USAF 1994). The entire airfield is within the Primary Surface, which includes all areas within 1,000 feet of each side of the runway centerline. In addition, the northern and southern ends of the airfield are within Clear Zones. Clear Zones are defined as areas 3,000 feet by 3,000 feet centered on and extending out from the ends of a runway. The Primary Surfaces and Clear Zones must remain clear of obstacles for flight safety. Airfield clearance is further discussed in Section 3.9.3.2, Airfield Clearance Requirements.

The Air Installation Compatible Use Zone (AICUZ) program is designed to protect Air Force personnel and the local community from noise exposure associated with flying activities and to help the Air Force with land use planning with regard to aircraft noise. Noise contours were developed for Shaw AFB in an AICUZ study published in 1994 (USAF 1994). This study reported that the entire airfield is within the 80 Ldn noise contour, indicating that this area has an 80-decibel (dB) or higher Day-Night Average Sound Level (Ldn or DNL). Noise contours are further discussed in Section 3.10, Noise. Munitions and explosives are stored in several areas in the vicinity of the airfield. These areas are surrounded by Q-D zones to ensure the safety of personnel and property from munitions and explosives. These Q-D zones are located in the southwest, northwest, and eastern regions of the airfield (see Section 3.9.2, Munitions Safety).

The ramp at the northwest end of the airfield is located near the North Gate and the base boundary. This area is approved for explosives, and the engine test facility (hush houses and trim pad) is located here. The temporary facilities currently being used by the FD are located near the engine test area and include manufactured buildings and fabric aircraft shelters. The presence of FD aircraft loaded with munitions requires a Q-D zone surrounding the facilities. A primary vehicle access road is located at the north end of the ramp. Future development planned for this area includes a new squadron operations facility to be built in the vicinity of the northwest ramp.

The majority of Shaw AFB operations are located to the west of the airfield in the main cantonment area. This area is largely developed, with little open space. Operations and maintenance facilities extend along the entire western edge of the airfield and act as a buffer between the airfield and other areas of the base. Facilities include AGE storage, aircraft maintenance hangars, aircrew training facilities, air passenger and freight terminals, avionics maintenance areas, the control tower, and flying squadron operations facilities. There is no setback limitation for buildings at the northwest ramp.

The southwest portion of the airfield is close to the Main Gate and the south boundary of the base. Industrial areas exist to the north of the Main Gate area and are close in proximity to the western boundary of the airfield. The 55th FS conducts operations in the southwest portion of the airfield. A historic hangar (B611) is located along the southwestern edge of the flight line.

The eastern portion of the airfield is much less developed than the western portion. This area consists primarily of open space and industrial areas. The crosswind runway area is southeast of Runway 04R and includes areas of condemned concrete and asphalt pavements. The munitions upload pad is located along the eastern edge of the airfield, and the munitions storage area is located east of the upload pad.

A new readiness complex is under development in the southeastern portion of the airfield just south of the munitions upload pad. It will include three separate facilities: a 5,400 SF Disaster Preparedness Facility; a 6,700 SF Mobility Storage Warehouse; and an Airfield Pavement Training Area. The Disaster Preparedness Facility will provide base personnel proper training for disaster preparedness, chemical warfare training, and additional

readiness issues. The new Mobility Storage Warehouse will improve storage conditions for this equipment, and the new Airfield Pavement Training Area will provide a training area outside the 1,000-foot lateral clear zone, consistent with safe flying operations.

3.1.1.2 Land Use Programs

Plans and programs have been adopted at Shaw AFB to provide land use recommendations for on-base development, and they are used to assist on-base officials and local community leaders in making compatible development decisions. Planning for future land use on Shaw AFB is provided in the Shaw AFB *General Plan* (SAFB 1999). The Land Use Component Plan, contained within the General Plan, details the base mission, evaluates existing land use and functional relationships, and provides guidance on land use changes that are required to meet future needs. Figure 3-3 depicts the future land uses for Shaw AFB and defines the boundaries of the future land use areas planned for the base. Five Area Development Plans (ADPs) and a Housing Community Plan have been developed for Shaw AFB, covering different areas of the installation (SAFB 1999). The area east of the airfield is the largest developable area on the installation. The Eastside Development Master Plan identifies a development scheme for this area, which is mostly forested, with the primary recommendations being the reduction of open space to accommodate airfield, aircraft operations and maintenance, industrial, and outdoor recreation activities.

The *Air Installation Compatible Use Zone (AICUZ) Study* (USAF 1994) for Shaw AFB recommends compatible land development in off-base areas in an effort to protect local citizens from aircraft noise exposure and accident potential associated with flying activities as well as to prevent degradation of the Air Force's capability to achieve its mission by promoting compatible land use planning. Shaw AFB and Sumter County have prepared a *Joint Compatible Land Use Study* (JCLUS) (SCCPC 1994) that incorporates the AICUZ recommendations with regard to land use and development. The JCLUS also describes existing land uses, identifies encroachment areas around the base, recommends modifications to the county zoning ordinance, addresses long-range infrastructure improvements, and describes 20-year growth trends for the area. Since the publication of the JCLUS, Sumter County has adopted new ordinances to limit future development within the noise zones and Accident Potential Zones (APZs) bordering the base (SAFB 1999).

3.1.2 Transportation

Vehicles enter and exit the base through five security checkpoints: the Main Gate on Shaw Drive, the Polifka Street Gate, the Frierson Street Gate, the Palmetto Heights Residential Gate on Sycamore Street, and the North Gate on Frierson Road (Byer 2004). The *Shaw Air Force Base General Plan* (SAFB 1999) notes that long range plans for development of the eastern portion of the base will require the improvement of existing roads and the addition of a new gate at the intersection of the extended Condor Country Road and US 76/378. Currently, a gate with an area for vehicle inspections is under

construction on the east side of the base off of Perimeter Road. Upon completion, this gate will be used by commercial vehicles entering the base (Behr 2004).

The on-base streets are classified as arterials, collectors, or local streets. The arterials, those streets that carry the majority of traffic, are Polifka Drive, Rhodes Avenue, and Shaw Drive. Six collectors (Condor Country Road, Killian Avenue, Lance Avenue, Patrol Road, Stuart Street, and Sweeney Street) distribute traffic from the arterials to the local streets or directly to intended destinations. The major arterial highway in the area is US 76/378, which borders Shaw AFB on the south and provides access to the Interstate Highway system (SAFB 1999). There is a 5-mile rail spur that is used to move POL tank cars from the CSX siding to the POL off-load area (SAFB 1999).

3.1.3 Visual Resources

Shaw AFB is characterized by a variety of landscape components primarily consisting of those human-modified features associated with the operation of a military installation. The main cantonment acreage includes runways, buildings, roadways, parking lots, lawns, golf course greens and fairways, athletic grounds, and open space. Additionally, there are four ponds (including Memorial Lake) and two streams located within the outdoor recreation areas and the open space area (SAFB 1999).

Approximately 160 acres of undeveloped, forested land still exist on Shaw AFB (SAFB 1999). This area is located along Spann Branch and Long Branch adjacent to the northern and eastern border of the base. It consists of mature trees, including native oak, pine, maple, and dogwood, as well as a multitude of shrubs and ground covers native to the area. A pine plantation of more than 300 acres is located east of the runways along the southeastern border of the base (SAFB 1999). The pine trees in this area are approximately 30 years old and enhance the aesthetic qualities of the base as well as provide a buffer between the base and the highway to the south.

3.2 INFRASTRUCTURE

The infrastructure of Shaw AFB includes utility systems (electrical and natural gas, potable water, wastewater, solid waste collection, storm drainage, heating and cooling, and liquid fuels) and the communications system. The capacities of the major utility systems on Shaw AFB are summarized in Figure 3-4.

3.2.1 Electrical and Natural Gas Systems

Shaw AFB purchases power from two public utility companies through two feeder lines. The Carolina Power and Light Company (CP&L) provides electricity to the main cantonment area and the majority of the housing area. The Black River Electric Cooperative (BREC) supports the remaining housing and southeastern portion of the base. BREC also provides emergency backup power for the main base. The total capacity of the electrical system is 28 megawatts (MW), and current usage is approximately 16 percent at peak periods (SAFB 1999). Either company has the capacity

and the capability to meet all electrical power requirements for the installation. A third feeder line is available from BREC, but there is not a load connection at this time. The on-base distribution system for 905 units of the family housing is owned and maintained by CP&L. BREC owns and maintains the distribution system for 799 military family housing units.

Natural gas is supplied to the base by the Carolina Pipeline Company via a 4-inch pipeline that enters the base at the junction of Sweeney Street and Frierson Road. A metering station divides the supply between the housing and industrial areas on the western portion of the installation. Natural gas is not currently supplied to facilities on the east side of Shaw AFB. The natural gas system has a capacity of 150,000 cubic feet per day and is currently 21.5 percent utilized (SAFB 1999).

3.2.2 Potable Water System

Shaw AFB operates an internal water system for the entire base. Treated water for the main cantonment area and the family housing areas is provided by six on-base government-owned wells through 34 miles of water mains. These wells have a capacity to provide 3.3 million gallons per day (mgd), based on a standard 16-hour pumping day. Average daily consumption is 1.5 mgd with peak demands at 2 mgd (SAFB 1999). The water is treated with sodium hexametaphosphate, chlorine, fluorine, and soda ash at each well site prior to storage in one of three above-ground storage tanks (ASTs).

The total storage capacity for potable water is 910,000 gallons. In addition, there are two ground level storage tanks providing 1 million gallons of potable water to support the fire protection system. An additional well has been drilled to provide non-potable water for irrigation. Water from this well is fed into No. 1 Hole Golf Course Pond.

The water system on base also has two interconnections with the High Hills Rural Water Company and one interconnection with the City of Sumter Water System. These interconnections are rarely used and are intended for emergencies.

3.2.3 Wastewater System

Shaw AFB discharges domestic and industrial wastewater to an on-base wastewater treatment plant (WWTP) that was constructed in the 1940s. A contractor operates the plant. Five lift stations move the wastewater from the main cantonment and housing areas to the WWTP. The treated water is discharged via a 24-inch gravity sewer line off base into Beech Creek and eventually flows into the Wateree River (NPDES permit No.SC0024970). Construction of an extension to the Shaw AFB WWTP sewer line outfall from its existing discharge into Beech Creek to a new location on the Wateree River is planned. This project would allow the base to meet current discharge limits for copper due to the higher flow of the receiving stream.

The WWTP has a rated capacity of 1.2 mgd, with an average daily flow of 0.8 mgd, and a one-time peak flow of 1.2 mgd generated by excessive rainfall (SAFB 1999). An

equalization basin has been constructed to accommodate heavy flows due to rainfall and several projects to eliminate piping cross connections and infiltration have been completed. This includes replacing lines throughout the base to reduce infiltration and inflow into the system, thereby lowering peak flows. Other improvements include replacement of some of the lift pump stations and expansion of the sewer system to the east side of the base. The sludge from the treatment plant is thickened and treated with three aerobic digesters and then stabilized with lime. It is then hauled off base for disposal (Behr 2004).

3.2.4 Solid Waste Disposal

Shaw AFB contracts with a private service to remove the solid waste from the base. In FY 2003 the base disposed of 3,848 tons of solid waste (SAFB 2004c). The base has an active recycling and reuse program to reduce the amount of solid waste that is transported to the landfill. Shaw AFB does not compost yard waste or other similar materials due to the small size of the base. Composting is not allowed within two miles of the flight line because of the risk of attracting birds (Hall 2004).

Construction and demolition waste is hauled to the Sumter County Landfill, located approximately 18 miles from the base. This landfill is currently projected to reach capacity within 20 years. All other solid waste is hauled to a landfill located in Bishopville, South Carolina (Hall 2004).

3.2.5 Storm Drainage System

The storm drainage system at Shaw AFB consists of a pattern of drainage pipes, ranging in diameter from 12 to 72 inches, and open swales. Drainage from the housing areas is channeled into three lakes located on the golf course. Water from these lakes is used for irrigation (SAFB 1999). Stormwater runoff from the base is regulated by SCDHEC and the NPDES permit program. Under the base NPDES permit (No. SC0024970), stormwater is discharged through four permitted outfalls. This permit became effective on April 23, 2003 and will expire on May 31, 2008.

The NPDES permit authorizes the Air Force to discharge stormwater to the following outfalls and receiving waters: Outfalls 002 and 004 collect stormwater from the area east of the airfield and discharge to Long Branch; Outfall 003 collects stormwater from the areas in the center of the base and south of the airfield, Outfall 007 collects stormwater from the areas in the center of the base and west of the airfield, and both Outfalls 003 and 007 discharge to Mush Branch (Singleton 2004). Long Branch and Mush Branch eventually flow into the Pocotaligo River east of the base.

In addition, there are two outfalls (005 and 006) that discharge to Long Branch and Booth's Pond, respectively. These two outfalls collect stormwater from the area east of the airfield and do not require permitting.

3.2.6 Heating and Cooling Systems

A single gas-fired, central heating plant provides heat to 22 buildings on base, including the dormitories in the 400 area and most of the buildings in the 900 area. The system can be switched to a 10,000 gallon No. 2 diesel fuel backup if necessary. Individual dedicated units provide heating and cooling for all other base buildings. Individual heat exchangers provide heating and cooling to family housing units.

3.2.7 Liquid Fuels System

All jet fuels are transported to the base by rail. A tank car siding capable of handling ten tank cars simultaneously is located adjacent to the three jet fuel storage tanks. These tanks have a combined storage capacity of 2.4 million gallons and are connected to a flight line hydrant refueling system. Three other tanks, capable of holding 12,000 gallons each, are available for unleaded gas, leaded gas, and diesel fuel. These products are delivered to the base storage area and then on to the military service station by tank trucks.

3.2.8 Communications System

The Command, Control, Communications, Computers, and Intelligence Blueprint for Shaw AFB identifies existing communications and information systems, shortfalls, planned improvements, and transitional and implementation plans (SAFB 2004d). Communications systems at the base include information transfer, telephone switching, data communications, long haul communications, and radio and security systems. Shaw AFB maintains a high capacity digital data network using single mode and multimode fiber optics that provides secure networking, electronic messaging (e-mail), and other services (SAFB 1999). The current telephone switching system fully supports switching needs for mission changes, dial-up local area networks, and additional beddowns, and it has ample trunking expansion capacity.

The Shaw AFB data system network includes classified and unclassified data systems essential to operations of the 20th FW, HQ 9th AF/USCENTAF, and tenant units. Recent upgrades include implementation of the Theater Battle Management Core System Unit Level and the Base Information Protection Firewall System. Long haul communications systems on Shaw AFB interconnect the voice and data systems with the wide area voice and data networks. These systems are routinely evaluated and improved as new technology becomes available. The Shaw AFB radio system consists of a Land Mobile Radio network and very high frequency and ultra high frequency radios. These systems, which are vital for tactical control of aircraft, are all in excellent condition. The base also has a flight line video surveillance system and a video teleconferencing system (SAFB 2004d).

3.3 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

The socioeconomic resource areas potentially affected by the Proposed Action include population, and employment and earnings. The Shaw AFB region of influence (ROI) addressed is Sumter County, South Carolina. Environmental justice, which concerns the disproportionately high or adverse effects of an action on minority and low-income populations, must be considered for federal actions under the NEPA review process.

3.3.1 Socioeconomics

The following sections describe the socioeconomic conditions of Shaw AFB and the surrounding area, which includes the City of Sumter and Sumter County. Where appropriate, comparisons are made with conditions for the State of South Carolina.

3.3.1.1 Population

Shaw AFB is located 10 miles west of downtown Sumter, in the center of Sumter County. Sumter is the largest city in Sumter County and the county seat. In 2000, the City of Sumter had a population of 40,213 and Sumter County had a population of 104,646 (US Census Bureau 2004). Shaw AFB supports a total of 17,715 people. Of this total, 5,460 people are classified as Appropriated Fund military, 11,111 are classified as active duty military dependents, 465 are classified as Appropriated Fund civilians, and 679 are classified as Non-Appropriated Fund contract civilians and private business. Of the 5,460 Appropriated Fund military, 2,259 live on base and 3,201 live off base. Of the 11,111 active duty military dependents, 4,518 live on base and 6,593 live off base (SAFB 2001c).

The county and city have not experienced much growth over the past 10 years. According to the 2000 Census, there has been about a 1 percent increase in the population of the City of Sumter and Sumter County since 1990. However, the South Carolina population increased by 15 percent during the same time period. It is not practical to predict population growth at the base; as with many military installations, Shaw AFB experiences shifts in population based on mission changes, deployments, and other operational considerations.

Population by race for the City of Sumter, Sumter County, and South Carolina in 2000 is presented in Table 3-1.

Table 3-1. Population by Race (2000)

	South Carolina	Sumter County	City of Sumter
Total Population	4,012,012	104,646	40,213
Racial Composition			
White	66.2%	49.5%	49.1%
African American	29.3%	46.6%	46.1%
Hispanic or Latino	2.3%	1.6%	1.9%
Other	2.2%	2.3%	2.9%

Source: U.S. Census 2000 (US Census Bureau 2004)

3.3.1.2 Employment and Earnings

Employment information is provided in Table 3-2. According to the 2000 Census, Sumter County and the City of Sumter exhibit employment rates similar to those seen throughout the state. The percentage of the population employed by the armed forces is considerably higher in the City of Sumter and Sumter County than in the state as a whole, as expected due to the contributions of Shaw AFB to city and county employment. The state unemployment rate was lower than that of the county or city.

Table 3-2. Labor and Employment (2000)

	South Carolina	Sumter County	City of Sumter
Total Labor Force*	1,974,222	48,696	18,569
Composition			
Civilian Employed	92.5%	84.9%	76.9%
Armed Forces	1.8%	8.1%	15.0%
Unemployed	5.7%	7.0%	8.1%

* Population 16 years and over
Source: US Census 2000 (US Census Bureau 2004)

The 1999 median household income was $37,082 for South Carolina; $33,278 for Sumter County, and $31,590 for the City of Sumter. Slightly fewer than 19 percent of households in the state were living below the poverty level ($15,260 for a family of three). The population of households with incomes below the poverty level was 21.1 percent in Sumter County and 22.8 percent in the City of Sumter.

Sumter County has historically been an agricultural community. However, recently it has developed a strong manufacturing base and retail trade sector. Based on the 2000 census, the largest type of industry in South Carolina and Sumter County is manufacturing (19.4 and 23.7 percent, respectively). In the City of Sumter, education, health, and social services are the largest employers (23.8 percent).

The proximity of Shaw AFB to Sumter is an important factor in the development and prosperity of the city. The total amount paid for annual payroll for Shaw AFB in Fiscal

Year (FY) 2001 was $248.1 million, and almost 90 percent of this amount was paid to military personnel. The total FY2001 annual expenditure for Shaw AFB was $47.1 million. Of this total, 51.9 percent was spent on construction on base, 34.0 percent was spent on services for the base, and 15.4 percent was spent on other materials, equipment, or supplies not included in construction and services. The remaining annual expenditure was spent on health, education, and the commissary. The services contracts include only those contracts in the local economic area or contracts requiring the use of locally supplied goods and services.

Approximately 2,075 indirect jobs have been created due to the presence of the base, with a total annual dollar value estimated at $53 million for FY2001. Considering the annual payroll for Shaw AFB, the annual expenditures, and the estimated annual dollar value of indirect jobs created, the total annual economic impact of Shaw AFB in FY2001 was estimated to be more than $348 million (SAFB 2001c).

3.3.2 Environmental Justice

Environmental justice must be considered for federal actions under the NEPA review process and in accordance with the Air Force EIAP (32 CFR 989.33). Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (issued February 11, 1994) requires that each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high or adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. A Presidential Memorandum directed to the heads of all federal departments and agencies, which recognized the importance of utilizing existing federal statutes and regulations, accompanied the Executive Order. The Memorandum states "each Federal agency shall analyze the environmental effects, including human health, economic, and social effects of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by NEPA."

Environmental justice analysis focuses on residents living within the areas where there would be potentially adverse environmental impacts, which for the purposes of this EA are those areas bordering Shaw AFB. Data collection efforts involving the identification of minority and low-income populations that might be affected by implementation of the proposed action or alternatives are central to the identification and consideration of environmental justice issues. The 2000 U.S. Census of Population and Housing reports the numbers of residents having minority and poverty status. Minority populations included in the census are identified as Black; American Indian, Eskimo, or Aleut; Asian or Pacific Islander; Hispanic; or Other. Poverty level is determined by the census using a set of money income thresholds that vary by family size and composition to determine poverty status. If the total income for a family or unrelated individual falls below the relevant poverty threshold, then the family or unrelated individual is classified as being "below the poverty level." For the purposes of this EA, low-income populations are considered to be the percent of population for all ages for whom poverty status has been determined by the US Census Bureau.

The census tracts bordering the base are tracts 2.01, 2.02, and 18.02 (Figure 3-5). Tract 2.01 is located west of the base, tract 2.02 is north and east of the base, and tract 18.02 is south of the base across US 76/378. In 1999, 6 percent of the population was living below the poverty level in tract 2.01, 13.6 percent in tract 2.02, and 20 percent in tract 18.02. In the same year, 13 percent of the population was living below the poverty level in Sumter County. In 1999, 45 percent of the people living in census tract 2.01 were considered minority populations, 46.8 percent in tract 2.02, and 59.4 percent in tract 18.02, while 50.5 percent of the people living in Sumter County were considered minority populations. In the State of South Carolina, 10.7 percent of the population was living below the poverty level, and 33.8 percent of the people living in the state were considered minority populations.

3.4 CULTURAL RESOURCES

Cultural resources include prehistoric and historic sites, structures, artifacts, districts or any other physical evidence of human activities considered important to a culture or community for scientific, traditional, religious, or other reasons. Cultural resources include prehistoric and historic archaeological resources, as well as architectural resources. Prehistoric archaeological resources are evidences of human activity that predate the advent of written records in the region. Historic archaeological resources include campsites, roads, battlegrounds, and other resources from the period of recorded history in the region. Architectural resources include structures or districts of historic or aesthetic significance, such as buildings, bridges, and dams. To be considered for protection, such architectural structures normally must be more than 50 years old. However, more recent structures, such as those constructed during the Cold War era, may warrant protection if they manifest the potential to gain significance in the future. Traditional resources are identified by Native American tribes or other groups and include properties of religious or cultural importance to an Indian tribe or Native Hawaiian organization.

According to the National Historic Preservation Act of 1966, all of the cultural resources described above may be considered historic properties. Section 106 of the Act, as amended, requires federal agencies to take into account the effects of their actions on historic properties. Historic properties are cultural resources that are listed in, or eligible for listing in, the National Register of Historic Places (NRHP). Once a resource is NRHP-listed, or designated as eligible or potentially eligible for listing, the federal agency must consult with the State Historic Preservation Office (SHPO) and submit a pre-construction notification to the USACE for permitting before proceeding with a project that may potentially impact the resource. Eligibility evaluation is the process by which resources are assessed relative to NRHP significance criteria for scientific or historic research, for the general public, and for traditional cultural groups. Under federal law, impacts to cultural resources may be considered adverse if the resources have been determined eligible for listing in the NRHP or have significance for Native American groups (SAFB 2001a).

AFI 32-7065, *Cultural Resources Management*, mandates that Shaw AFB maintain a current and approved *Cultural Resources Management Plan* (CRMP) of appropriate scope. The CRMP primarily assigns responsibility for carrying out cultural resource compliance on Shaw AFB, contains an inventory and evaluation of known cultural resources on Shaw AFB, identifies the potential for other cultural resources, and contains standard operating procedures to implement the CRMP.

The CRMP is reviewed and updated by the installation annually and integrated into the *Base Comprehensive Plan* (BCP). The CRMP is then approved by Shaw AFB's Major Command every five years. The South Carolina SHPO is given an opportunity to review and comment on the plan. Once the CRMP is adopted, a Programmatic Agreement is signed by the SHPO and the Advisory Council on Historic Preservation and serves to eliminate the need for consultation on a case-by-case basis for some base activities as related to cultural resources. The 2001 Shaw AFB CRMP (SAFB 2001a and 2001b) was the primary source of information used in this assessment.

Architectural resources have been surveyed on Shaw AFB, and one building has been declared eligible for inclusion in the NRHP: B611, a hangar located near the south end of the Shaw AFB flight line (Figure 3-6). Hangar B611 was built in 1942 and is historically significant as an important example of a form of industrial construction that occurred during World War II (SAFB 2001b).

Archaeological resources have been surveyed on Shaw AFB, but none have been identified. One potentially eligible archaeological site (FS-1) is located on the northern bank of Long Branch near the northern boundary of the base (New South Associates 2003). In addition, three sites at Shaw AFB have been identified but have not been assessed for eligibility (SAFB 2001b).

Traditional resources have been surveyed on Shaw AFB, but none have been identified. A reconnaissance survey of Cold War-era resources at Shaw AFB resulted in the examination of one resource, a documentary collection, which was selected for documentation and evaluation (SAFB 2001b). The Catawba Indian Nation, the federally recognized tribe closest to Shaw AFB, is located approximately 90 miles northwest of the base near Rock Hill, South Carolina. It has not identified traditional resources on Shaw AFB (SAFB 2001b).

In summary, there are no NRHP-listed cultural resources at Shaw AFB (NRHP 2004). However, there is one architectural site that is eligible for listing in the NRHP (Hangar B611) and three archaeological sites that have not been evaluated for eligibility for listing.

3.5 BIOLOGICAL RESOURCES

The biological resources potentially affected by the Proposed Action are the plants, animals, and other biota in the vicinity of the proposed project (i.e., on Shaw AFB). The biota of a particular area may be considered to compose an ecological community. The

community is used as an organizational concept in ecology and is employed below in describing the biological resources of the study area based on terrestrial and wetland/aquatic communities. In addition, the potential for rare species to occur within these communities is discussed.

3.5.1 Terrestrial Communities

Temperate Coniferous Forest is the major habitat type native to the region. Within this major habitat type, the ecoregion encompassing the area of the base and extending to the coast is classified as Middle Atlantic Coastal Forest (Ricketts et al. 1999). This native forest has historically been cleared in the majority of the study area, and the landscape has been altered and developed.

Most of the area within Shaw AFB has been extensively disturbed in the past, and few natural communities remain. Consequently, the predominant ecological community on the base, which covers approximately 84 percent of its area, has been classified as disturbed/urbanized. The other terrestrial community types identified on Shaw AFB, and their approximate percentage coverage of the base, are: pine plantation (13 percent) and oak/hickory forest (<1 percent) (SAFB 2001d). These terrestrial community types are discussed below.

Disturbed/Urbanized – Most of the grounds on Shaw AFB that are not covered by buildings or pavement are semi-improved to improved and are intensively landscaped and maintained. The vegetation within these areas consists principally of lawn grasses and ornamental shrubs and trees. Examples of the animal species likely to occur within this community include the cottontail, mockingbird, American robin, and American crow.

Pine Plantation – This community occupies over 300 acres in the southeastern corner of Shaw AFB, providing a buffer between the base and the highway (US 76/378). The planted trees consist primarily of loblolly pines that are approximately 30 years old, 40 feet tall, and planted on a 10-by-10-foot or 8-by-12-foot spacing (SAFB 2001d and 2004e). The understory of this community includes broomsedge, primrose, wild plum, blackberry, and hawthorn. Examples of the animal species likely to occur within this community include the white-tailed deer, red fox, raccoon, opossum, striped skunk, cottontail, meadowlark, mockingbird, American kestrel, fence lizard, and black racer.

Oak/Hickory Forest – This community occurs only in the northern part of Shaw AFB adjacent to the housing areas. Native species within this community include white oak, pignut hickory, mockernut hickory, sparkleberry, flowering dogwood, winged elm, and loblolly pine. Examples of the animal species likely to occur within this community include the gray squirrel, southern flying squirrel, cottontail, American robin, and blue jay.

3.5.2 Wetland/Aquatic Communities

Wetland and aquatic communities occupy only a small area (slightly over 1 percent) of Shaw AFB (Figure 3-7). The wetland and aquatic community types identified on Shaw AFB are bottomland hardwood/small stream forest and ponds (SAFB 2001d).

Bottomland Hardwood/Small Stream Forest – True bottomland hardwood forest is not present within the perimeter of Shaw AFB, but this community does occur along the eastern base boundary within the floodplain of Long Branch. Long Branch crosses the northeast corner of the base within the runway approach. The community along the stream in this area and extending upstream to the confluence of Spann Branch and Long Branch in the northeast corner of the base has been described as Small Stream Forest. Both Bottomland Hardwood and Small Stream Forest communities are similar in that they are periodically flooded, have similar soils, and have several of the same tree species. The Small Stream Forest south of this confluence and within the runway approach has been altered by past disturbance along Long Branch and the subsequent invasion of the floodplain by exotic plant species (SAFB 2001d). Within this area, Long Branch is surrounded by mainly hardwood forest consisting principally of river birch, red maple, sweetgum, and water oak.

As Long Branch flows south from the runway approach, it crosses the base boundary, parallels the boundary, and flows southeast to Booths Pond. In this area, the broad, swampy floodplain of Long Branch supports a Bottomland Hardwood Forest with a tall tree canopy and extensive areas of shallow, standing water and dense vegetation. The principal overstory trees in this forest include yellow poplar, sweetgum, red maple, tupelo, loblolly pine, water oak, and sycamore. The understory species include sweetbay, witchhazel, possumhaw viburnam, switchcane, greenbrier, blackberry, and cinnamon fern. Within this community, Long Branch is a meandering stream with a width of approximately 8-10 feet, a depth of 3-5 feet, and a significant flow.

One other area of Small Stream Forest on the base occurs in Mush Swamp, which originates in the southwestern corner of the base property on the south side of US 76/378. Mush Swamp retains a reasonably well-developed hardwood canopy of native tree species such as red maple, ash, laurel-leaf oak, and hackberry, as well as an understory that includes wax myrtle. However, its floodplain also has been extensively invaded by a number of exotics, such as the non-native shrubs Chinese privet and Japanese privet (SAFB 2001d).

Examples of the animal species likely to occur within this wetland community include the white-tailed deer, gray fox, muskrat, beaver, river otter, raccoon, opossum, wood duck, pileated woodpecker, kingfisher, lesser siren, amphiuma, and several species of minnow.

Pond – There are no natural ponds on Shaw AFB, but four artificial ponds have been built on the base, all within the heavily developed western area of the installation. Two of the ponds are on the golf course (No. 1 Hole Golf Course Pond and No. 8 Hole Golf

Course Pond), one adjoins the golf course (Memorial Lake), and the smallest is southwest of the golf course behind the chapel (Chapel Pond). The ponds are managed for recreation (fishing and picnicking) and aesthetics. The pond margins are maintained in a largely open condition through regular mowing and trimming of taller vegetation. Emergent wetland vegetation within shallows and along the edges of the pond communities on the base includes nama, water-spider orchid, meadow beauty, bugle-weed, ludwigia, downy lobelia, and smartweed. Examples of the animal species likely to occur within the pond communities include the mallard, Canada goose, kingfisher, largemouth bass, bullhead catfish, and various species of sunfish (SAFB 2001d).

Memorial Lake is about 5.5 acres in size and is used extensively for fishing. The lake's banks generally have a small degree of slope, providing habitat for aquatic vegetation and domesticated waterfowl. The pond has chronic aquatic weed and algae problems due to its design, golf course runoff, and the waterfowl population. Chapel Pond is approximately ¾ acre in size and contains a small island. The No. 1 Hole Golf Course Pond is about 5.5 acres in size, and the No. 8 Hole Golf Course Pond is approximately 7.3 acres in size. It receives run-off from the golf course, provides irrigation water for the golf course, and is partially accessible for fishing (SAFB 2001d).

3.5.3 Endangered, Threatened, and Special Concern (ETSC) Species

Section 7 of the federal Endangered Species Act, as amended, requires each federal agency to ensure that "any action authorized, funded, or carried out by such agency ... is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species ... unless such agency has been granted an exemption for such action..." In addition, animals designated by South Carolina as state endangered or threatened are granted legal protection by the state. The Heritage Trust Program of the South Carolina Department of Natural Resources maintains a database of reported occurrences of endangered and threatened species, as well as species considered to be of special concern by the state of South Carolina due to their declining populations in the state. This database can be searched online by county and by 7.5-minute South Carolina topographical quadrangle maps.

The South Carolina Heritage Trust Database was searched for records of ETSC species potentially occurring in Sumter County, which encompasses Shaw AFB. The species identified are those for which occurrences in the county have been reported. Accordingly, these species potentially could occur on or in the vicinity of Shaw AFB if their required habitat is present. Table 3-3 identifies the federal and state listed ETSC species from the database for Sumter County, specifies their legal status, and includes a brief description of the typical habitat of each species.

Table 3-3. South Carolina Endangered, Threatened, and Special Concern Species Inventory for Sumter County

Scientific Name	Common Name	Legal Status	Special Concern Status *	Habitat
Birds				
Haliaeetus leucocephalus	Bald eagle	FT/SE	-	Edges of lakes and large rivers; seacoasts.
Ictinia mississippiensis	Mississippi kite	-	SC	Woodlands and brushy areas, near water.
Picoides borealis	Red-cockaded woodpecker	FE/SE	-	Open pine woods; pine savannas.
Sterna antillarum	Least tern	ST	-	Sandy beaches; sandbars.
Mammals				
Corynorhinus rafinesquii	Rafinesque's big-eared bat	SE	-	Pine and hardwood forest; caves; abandoned buildings
Ursus americanus	Black bear	-	SC	Large undeveloped wooded tracts.
Reptile				
Micrurus fulvius	Eastern coral snake	-	SC	Hardwood forest; pine flatwoods; marshes.
Amphibian				
Acris crepitans crepitans	Northern cricket frog	-	SC	Margins of shallow ponds or marshy areas.
Plants				
Aristida condensate	Piedmont three-awned grass	-	SC	Sandridges.
Carex decomposita	Cypress-knee sedge	-	SC	Swamps and lake margins on floating logs.
Carya myristiciformis	Nutmeg hickory	-	RC	Wet floodplain forests.
Chamaedaphne calyculata	Leatherleaf	-	SC	Wetlands and bogs.
Cyperus lecontei	Leconte flatsedge	-	SC	Sand dune swales; pond margins.
Echinodorus parvulus	Dwarf burhead	-	SC	Shallow pools and ponds.
Echinodorus tenellus	Dwarf burhead	-	SC	Shallow pools and ponds.
Eleocharis robbinsii	Robbins spikerush	-	SC	Pine savanna ponds.
Eupatorium recurvans	Coastal-plain thorough-wort	-	SC	Depressions.
Lobelia boykinii	Boykin's lobelia	-	SC	Cypress ponds; swamp margins.
Nestronia umbellula	Nestronia	-	SC	Oak-hickory-pine woods; often in transition areas between flatwoods and uplands.
Oxypolis canbyi	Canby's dropwort	FE	SE	Cypress ponds and sloughs; wet savannas.
Plantago sparsiflora	Pineland plantain	-	SC	Open, wet pine savannas; shallow ditches.

Scientific Name	Common Name	Legal Status	Special Concern Status *	Habitat
Rhexia aristosa	Awned meadowbeauty	-	SC	Pond margins and wet savannas.
Rhexia cubensis	West Indian meadow-beauty	-	SC	Wet savannas including cutthroat seeps, flatwoods, and bogs.
Rhynchospora scirpoides	Long-beaked baldrush	-	SC	Floating mats in ponds; pond margins.
Ruellia caroliniensis	A petunia	-	SC	Woods and wood margins.
Sagittaria isoetiformis	Slender arrow-head	-	SC	Sandy ponds and bogs.
Schwalbea americana	Chaffseed	FE	SE	Ponds margins and wet savannas; land ridge forest.
Scleria baldwinii	Baldwin nutrush	-	SC	Wetlands.

Notes:
FE = Federal Endangered; RC = Of Concern, Regional (unofficial - plants only); SE = State Endangered (official state list - animals only); ST = State Threatened (official state list - animals only); SC = Of Concern, State.
* The status designations in this column do not confer legal protection; these species are of special concern in the state because their populations may be declining.
- = no status designation
Source: South Carolina Heritage Trust (http://www.dnr.state.sc.us/pls/heritage). Website accessed 6/16/2004; data were last updated 6/9/2003; habitat descriptions obtained from a variety of sources.

In order to further evaluate the potential for any of the ETSC species in Sumter County to occur in areas potentially affected by the Proposed Action, the Heritage Trust Database also was searched for the locations of ETSC species occurrences within the 7.5-minute quadrangles that encompass Shaw AFB. Inventories are periodically conducted on Shaw AFB in an attempt to locate any ETSC plants and animals that potentially occur on these facilities (SAFB 2001d), and the results of these facility-specific surveys are reflected in the database records.

On Shaw AFB, the only ETSC species reported to occur is the least tern, which is state listed as threatened. Breeding least terns were observed nesting on the roof of the Base Exchange (BX) building on Shaw AFB during June 2001. Eight terns were observed in the colony, and one young was fledged. This is the farthest inland breeding record for the least tern in South Carolina. Least terns prefer to nest on coastal beaches in the state, but due to developmental pressures, they have been documented to nest on rooftops. This legally protected species is being monitored on the base and efforts are being made to minimize disturbance to the colony site (SAFB 2001d). The BX building is located in the middle of the developed western part of Shaw AFB, approximately 500 feet south of the No. 8 Hole Golf Course Pond and 1,000 feet west of the flight line.

3.6 WATER RESOURCES

Water resources include surface waters and groundwater. Surface waters on Shaw AFB include ponds, streams, and other wetlands. Groundwater underlying the base is used as a source of drinking water.

3.6.1 Surface Waters

The primary surface water resources on Shaw AFB include three streams, four artificial ponds, and canals and ditches created to collect storm-water runoff from runways and taxiways (SAFB 1999). The three naturally occurring streams at Shaw AFB are Long Branch, Spann Branch, and Mush Branch (Figure 3-7). Spann Branch crosses a short segment of base property at the northern boundary of the base and flows into Long Branch near the Palmetto Heights housing area. Long Branch eventually flows through the northeast corner of the base, and then off-base to Booths Pond, Sawmill Pond, and Mush Swamp west of Sumter. The waters in the swamp eventually become part of the headwaters of the Pocotaligo Swamp and River south of Sumter (SAFB 2001d). The Pocotaligo River flows into the Black River, which empties into the Atlantic Ocean near Georgetown, South Carolina (SAFB 2001d). Mush Branch originates in the southern corner of the base property, south of US 76/378. It flows south from the highway across the base boundary and into Mush Swamp.

No. 1 Hole Golf Course Pond, No. 8 Hole Golf Course Pond, Memorial Lake, and Chapel Pond are centrally located within the developed area of the base and are used primarily for recreational and aesthetic purposes (Figure 3-7). No. 1 Hole Golf Course Pond is the northernmost pond and is approximately 5.5 acres in area. No. 8 Hole Golf Course Pond is located just south of No. 1 Hole Golf Course Pond and is approximately 7.3 acres in area. Memorial Lake is located south of the golf course ponds, its eastern shoreline is adjacent to Shaw Drive and west of B1130, and it is also approximately 5.5 acres in area. Chapel Pond is the smallest and southernmost of the ponds and is located behind the Palmetto Chapel (SAFB 2001d).

3.6.2 Surface Water Quality

The water quality of the surface water resources within Shaw AFB is potentially impacted by point and non-point sources of pollutants. Water bodies are classified by the state based on their water quality, and discharges that can affect water quality are regulated through permits.

3.6.2.1 Water Quality Classifications

No waters classified as Outstanding Resource Waters (ORW) occur within one mile of Shaw AFB (Kirkland 2004). The Pocotaligo River and its tributaries, including Long Branch, have been designated by South Carolina as Freshwaters, indicating they are suitable for secondary contact recreation, drinking water supply after conventional treatment, fishing, and the survival and propagation of a balanced indigenous aquatic

community of flora and fauna. South Carolina freshwaters also are considered suitable for agricultural or industrial uses (SCDNR 2004).

The state also classifies water bodies based on impairment. South Carolina's Section 303(d) List (SCDNR 2004) is a comprehensive public accounting of all impaired water bodies in the state. No water bodies on or in the immediate vicinity of Shaw AFB are on the South Carolina Section 303(d) List. However, the Pocotaligo and Wateree Rivers, where surface waters from Shaw AFB ultimately drain, are designated as biologically impaired water bodies regulated under the provisions of the CWA Section 303(d). They are both listed as impaired because of a fish advisory for mercury and aquatic life impairment due to low dissolved oxygen levels. Additionally, the Wateree River is listed as having a recreational use impairment due to fecal coliform contamination (SCDNR 2004).

3.6.2.2 NPDES

Stormwater runoff from the base is regulated by the NPDES permit program administered by SCDHEC. Under the Base NPDES permit (No. SC0024970), there are six permitted outfalls through which wastewater and stormwater are discharged from the base. This permit became effective on April 23, 2003 and will expire on May 31, 2008. The permit authorizes Shaw AFB to discharge to the following permitted outfalls and receiving waters. Outfall 001, which discharges treated wastewater from the WWTP, and Outfall 01A, which discharges treated groundwater from an air sparging unit, both discharge to Beech Creek, which drains west to the Wateree River. Outfalls 002 and 004 discharge stormwater to Long Branch, which drains to the Pocotaligo River. Outfalls 003 and 007 discharge stormwater to Mush Branch, which also drains to the Pocotaligo River. In addition to the six permitted outfalls above, two outfalls are no longer required to be permitted: Outfalls 005 and 006 collect stormwater from the east base and discharge to Long Branch and Booths Pond, respectively (SCDHEC 2001).

3.6.2.3 Non-Point Source Discharge

Unlike pollution from industrial and sewage treatment sources, non-point source (NPS) pollution comes from many non-discrete sources. As rainfall runs off the land and man-made structures, natural and man-made pollutants are picked up, transported, and ultimately deposited into lakes, rivers, wetlands, coastal waters, and groundwater. These pollutants may have harmful effects on water quality, adversely affecting drinking water supplies, recreation, wildlife, and fisheries. Potential NPS pollution at Shaw AFB originates from fertilizers, herbicides, and insecticides used in landscaped and developed areas; hydrocarbon and chemical runoff from parking lots, roadways, and the flight line; and sediment runoff from construction sites and land clearing.

3.6.3 Groundwater

There are three aquifer systems in the area of Shaw AFB including the Middendorf aquifer system, the Black Creek aquifer system, and the shallow aquifer system (SAFB

2001d). The Middendorf (Tuscaloosa) Aquifer is the deepest and most productive of the aquifer systems in the western portion of Sumter County. This aquifer is approximately 250 feet thick and is encountered at about 50 feet below mean sea level (MSL) at Shaw AFB. The Middendorf Aquifer is confined by a clay layer 15-to-75-feet-thick located at the base of the Black Creek Formation (SAFB 2001d).

The Black Creek aquifer system underlies most of Sumter County and is a significant water source for much of the central coastal plain (SAFB 2001d). The Black Creek Aquifer is separated into upper and lower portions by a confining layer. The upper aquifer is approximately 50 to 70 feet thick while the lower aquifer ranges from 75 to 105 feet thick. Wells completed in the Black Creek Aquifer are capable of yielding up to 750 gallons per minute (gpm). The six water supply wells currently operating at Shaw AFB are screened in the Black Creek Aquifer (Rust 1997).

The shallow aquifer system in the Shaw AFB area is made up of the Lang Syne Formation of the Black Mingo Group and the Duplin Formation. The Lang Syne Aquifer is located in the northwestern area of Shaw AFB, northwest of the Orangeburg Scarp. The Duplin Aquifer is present southeast of the scarp. The two aquifers are not hydraulically connected due to the presence of an aquitard, the fine-grained Sawdust Landing Formation, underneath the Lang Syne Aquifer (SAFB 2004e).

3.7 AIR QUALITY

Air quality is defined in a regulatory sense in terms of attainment status relative to national and state standards and other factors. The CAA, which was last amended in 1990, requires EPA to set primary and secondary National Ambient Air Quality Standards (NAAQS) for widespread pollutants considered harmful to public health and the environment. The EPA has set NAAQS for six principal pollutants, called "criteria" pollutants. They are ozone (O_3), particulate matter less than 10 microns in diameter (PM_{10}), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen oxides (NO_x), and lead (Pb).

Under the CAA, state and local agencies may establish ambient air quality standards and regulations of their own, provided these are at least as stringent as the federal requirements. The EPA has designated the Bureau of Air Quality of SCDHEC as the lead agency for enforcing federal laws and regulations dealing with air pollution in South Carolina. Air quality rules in South Carolina are specified in South Carolina Regulation 61-62, *Air Pollution Control Regulations and Standards*.

3.7.1 Regional Air Quality

The EPA designates areas of the United States based on how they meet the NAAQS: *Nonattainment* – does not meet the national primary or secondary ambient air quality standard for the pollutant; *Attainment* – meets the standard for the pollutant; *Unclassifiable* – cannot be classified on the basis of available information as meeting or not meeting the standard. A *maintenance area* is a geographic region designated as

"nonattainment" and subsequently re-designated as "attainment" subject to the requirements of a maintenance plan.

By federal law, each state has to develop a SIP that explains how they will implement the CAA requirements. The South Carolina SIP consists of South Carolina Regulation 61-62, specific attainment and maintenance plans for nonattainment areas in South Carolina, and supporting documentation.

Sumter County, which encompasses Shaw AFB, is designated as "attainment" for meeting the national and state ambient air quality standards for the criteria pollutants. No federally protected Prevention of Significant Deterioration (PSD) Class I area is located near Shaw AFB.

3.7.2 Air Emissions Sources

Shaw AFB holds a Title V Operating Permit (No. TV-2140-0004), which was issued by SCDHEC on April 30, 2001 and expires on November 30, 2005. The permit is intended to assure compliance with existing requirements applicable to regulated sources. Current air emissions at the base occur as a result of aircraft operations, including activities associated with aircraft refueling and maintenance. Mobile sources include aircraft, on-road vehicles, emergency generators, and AGE. Stationary sources include abrasive-based cleaners, surface coating operations, solvent-based cleaning machines, jet engine testing, fuel storage, fuel distribution, non-destructive inspection, and equipment leaks. Non-mission-related sources of air emissions at the base include boilers (external combustion), emergency generators (internal combustion), and woodworking.

The 2003 air emissions inventory for non-exempt stationary sources at Shaw AFB is summarized in Table 3-4. Table 3-5 shows the contributions to total emissions by source category.

Table 3-4. Summary of 2003 Total Emissions from Non-exempt Stationary Sources

Pollutant	2003 Emissions (pounds/year)
CO	37,350
NO_x	87,889
SO_2	10,856
PM_{10}	4,174
Lead	12
Total Volatile Organic Compounds (VOCs)	53,782
Total Hazardous Air Pollutants (HAPs) and Total Toxic Air Pollutants (TAPs)	3,261

Source: Shaw AFB, 2004f

Table 3-5. Source Contributions to 2003 Total Emissions (pounds/year)

Pollutant: / Source	CO	NO_x	SO_2	PM_{10}	Pb	Total VOCs	Total HAPs and TAPs
ASTs	--	--	--	--	--	893	129
Abrasive cleaners	--	--	--	3	--	--	--
Degreasers	--	--	--	--	--	383	7
Emergency generators	930	4,258	304	286	--	333	6
Equipment leaks	--	--	--	--	--	--	21
External combustion	10,450	14,027	719	1,019	> 1	686	227
Fuel dispensing	--	--	--	--	--	42,266	1,174
Incinerators	23	7	6	11	--	7	--
Jet engine testing	25,947	69,597	9,827	2,098	12	3,197	999
Loading racks	--	--	--	--	--	1,118	44
Paper shredder	--	--	--	> 1	--	--	--
Surface coating	--	--	--	270	--	1,292	598
USTs	--	--	--	--	--	3,607	56
WWTP	--	--	--	483	--	--	--
Woodworking	--	--	--	4	--	--	--
Total	37,350	87,889	10,856	4,174	12	53,782	3,261

Source: Shaw AFB, 2004f

3.8 HAZARDOUS MATERIALS AND WASTE MANAGEMENT

The following section describes various hazardous materials and wastes that are used and generated at Shaw AFB. Areas potentially contaminated with hazardous wastes that are part of the Air Force Environmental Restoration Program (ERP) are also discussed. Hazardous materials and wastes are regulated under RCRA.

In order to comply with federal and state regulations, Shaw AFB has implemented a *Hazardous Waste Management Plan* (HWMP). This plan is an internal guidance document that provides for all hazardous materials and wastes on base to be managed, accumulated, transported, and disposed of in an environmentally sensitive manner (USAF 2003a). SCDHEC issued a permit (Permit No. SC7570024466) classifying Shaw AFB as a large quantity user and authorizing Shaw AFB to use, generate, and store hazardous materials and waste.

3.8.1 Hazardous Materials

Hazardous materials are any material that is not a waste; has been designated in the 49 CFR 172.101 Hazardous Materials Table; and has been determined by the US Department of Transportation (DOT) to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce. Activities at Shaw AFB that

require the use and storage of hazardous materials are mainly associated with aviation and vehicle maintenance activities. These materials include but are not limited to fuels, batteries, antifreeze, paints, and solvents. Additional activities that may require the use and storage of hazardous materials include fire and weapons training activities. At Shaw AFB, lead-based paints, asbestos, and stored fuels are hazardous materials regulated under specialized management programs.

Many of the buildings at Shaw AFB were constructed during a time period when it was common to use asbestos-containing material (ACM) and lead-based paints (LBP) in the construction and maintenance of buildings. Asbestos is often found in pipe insulation, floor tiles and mastic, some wallboard, and ceiling tiles.

The *Asbestos Management Plan* (AMP) for Shaw AFB (USAF 2003b) is designed to establish management and organizational responsibilities and procedures for ensuring that personnel in Air Force facilities are not exposed to excessive levels of airborne asbestos fibers. The plan's focus is on taking positive action to deal with current and near-term asbestos management needs, rather than on planning solely for future removal of ACM from base facilities. The AMP will provide the foundation for maintaining a permanent record on the current status and condition of ACM on Shaw AFB. The plan is reviewed each year and updated as necessary (USAF 2003b). A Lead-Based Paint Management Plan has also been developed to establish procedures for ongoing monitoring of intact lead-based paint surfaces and lead contaminated soil areas at Shaw AFB.

The Shaw AFB Abatement Team conducts surveys for ACM and LBP. A basewide survey has not been performed, and surveys are conducted on an as-needed basis. Based on the age of the buildings on the base, it is assumed that ACM and LBP are present in many buildings.

USTs are regulated though the SCDHEC UST Program. A 1996 basewide survey identified 154 USTs at Shaw AFB that were either in use, removed, or abandoned in place. Of these, 34 USTs are in use. Contents of the tanks include gasoline, No. 2 fuel oil, diesel fuel, and JP-8 jet fuel. The survey also identified 175 ASTs. AST contents include diesel fuel, gasoline, JP-8, 1010 oil, No. 2 fuel oil, and used oil (USAF 2003a).

3.8.2 Hazardous Waste

Hazardous waste is defined under RCRA as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that could pose a substantial hazard to human health or the environment. Waste may be classified as hazardous because of its toxicity, reactivity, ignitability, or corrosivity. Certain types of wastes are “listed” or identified as hazardous in 40 CFR 263 (USAF 2003a).

Hazardous wastes generated on Shaw AFB are typically associated with operations and maintenance of the aircraft and vehicles. They include solvents, spent acids, and sludge from wash racks. There are currently 40 initial accumulation points for hazardous waste

generated on the base. There are eight 90-day hazardous waste accumulation points on Shaw AFB where hazardous waste may be accumulated in tanks and/or containers for up to 90 days (SAFB 2003b). A large amount of waste is recycled, including all lubricating fluids, batteries, oil filters, and shop rags. During the first three quarters of FY 2003, Shaw AFB generated 38,234 pounds of regulated hazardous waste.

Shaw AFB operates one hazardous waste management facility that requires a permit under state and federal regulations (Permit No. SC7570024466). The facility is a hazardous waste treatment, storage, and disposal (TSD) facility that is operated by the DRMO. The RCRA TSD permit was first issued by SCDHEC in October 1992 and allows for the storage of 7,026 gallons of hazardous waste (USAF 2003a).

3.8.3 Environmental Restoration Programs

Shaw AFB has been an active Air Force base for approximately 63 years. Past and current activities include maintenance of aircraft and vehicles, facility upkeep, and fuel/oil storage. As a result of these activities, some areas on the base have become contaminated with hazardous or toxic substances (e.g., petroleum products such as JP-4 jet fuel, waste oils, solvents, and pesticides). Depending on the cause and type of contamination, sites may be regulated under three different state or federal regulatory programs: CERCLA, RCRA, and the South Carolina UST Program. Sites at Shaw AFB that are potentially contaminated with hazardous or toxic substances are regulated under the RCRA and South Carolina UST programs. There are no CERCLA (Superfund) sites at Shaw AFB.

The DoD developed the ERP to identify, investigate, and remediate potential hazardous waste sites that existed on DoD properties prior to 1984. The *Shaw AFB Management Action Plan* (USAF 2003c) summarizes the current status of the base environmental programs and ERP sites, and it presents a comprehensive strategy for implementing actions necessary to protect human health and the environment. This strategy integrates activities under the ERP and the associated environmental compliance programs that support full restoration of the base. ACC policy requires that any project on or near an ERP site be coordinated through the Shaw ERP Manager.

There are 34 ERP sites and two Areas of Concern on Shaw AFB. Fourteen of the ERP sites have been administratively closed, and an additional eight sites are pending closure. These sites include landfills, sludge disposal, fire training areas, fuel spills, fuel leaks from tanks and pipelines, drainage areas, oil/water separators, and other disposal areas. ERP sites are shown in Figure 3-8.

3.9 SAFETY

The subject of safety encompasses many issues that directly affect the protection of human life and property. The predominant safety issues relevant to the Proposed Action at Shaw AFB involve general operations and construction, munitions, aviation, and force protection.

3.9.1 General Operational Safety

Day-to-day operations at Shaw AFB are conducted in accordance with applicable Air Force safety regulations, Air Force technical orders, and standards prescribed by Air Force Occupational Safety and Health (AFOSH) requirements. These regulations prescribe measures, processes, and procedures to ensure safe operations and to protect the public, military, and property. These regulations govern all aspects of daily activity at the installation, and their applicability ranges from standard industrial and construction safety requirements (e.g., wearing of hard hats and safety clothing) to complex procedures concerning aircraft operations and maintenance of munitions.

3.9.2 Munitions Safety

Shaw AFB and other installations with munitions or explosives storage, handling, and maintenance facilities are required to establish safety clearance zones around these facilities. Air Force Manual (AFM) 91-201, *Explosives Safety Standards* (USAF 2000), requires that defined distances be maintained between explosives storage and handling areas and a variety of other types of facilities. These distances define Q-D zones. Each munitions storage or handling facility has a Q-D zone extending from the sides and corners of the building outward for a prescribed distance, resulting in a series of arcs that define the perimeter of the Q-D zone. The size of a Q-D zone depends on several factors, including the type and quantity of explosives contained in the facility. The quantity is based on the net explosive weight of the munitions, i.e., the weight of the actual explosives in the munitions not including the weight of the steel casing or other non-explosive components. In addition, munitions storage facilities must be located in areas where their security can be ensured.

Air Force safety regulations define many factors that affect Q-D requirements. One of these factors that may be a significant constraint to adjacent development is the allowable distance to an inhabited building (IB). The IB distance is also required to be maintained between explosive storage and handling locations and base boundaries, roadways, or the perimeter of any existing "local restrictive easement estate" or agreement (USAF 1994). The IB distance does not apply if the base or restrictive easement boundary is located adjacent to land that is open and unsuitable for habitation or public gatherings.

Property within Q-D zones must be owned, leased, or controlled by the base or its tenants, or an easement must be acquired that restricts use of the property to those uses compatible with the safety requirements of AFM 91-201. The existing Q-D zones on Shaw AFB are associated with munitions storage areas on the east side of the base, the central portion of the airfield, and the flight line area (Figure 3-9).

The management and use of ordnance and munitions in conjunction with airbase operations and training activities conducted by the 20th FW at Shaw AFB is described in Section 3.2, Safety, of the *Environmental Assessment for Force Structure Change at Shaw Air Force Base, South Carolina* (USAF 2002). The existing safety-related

environmental conditions identified for the 20th FW in that EA are also applicable to the proposed FD Facility.

3.9.3 Aviation Safety

The DoD developed the AICUZ program for military airfields in order to protect aircraft operational capabilities while assisting local governments in protecting and promoting the health and safety of the public. AICUZ reports describe three basic types of constraints that affect or result from flight operations: noise zones (described in Section 3.10), accident potential zones, and airfield clearance requirements (i.e., height limitations on structures in the vicinity of airfields) (USAF 1994).

3.9.3.1 Accident Potential Zones

Accident potential zones are based on statistical analysis of past DoD aircraft accidents. DoD analysis has determined that the areas immediately beyond the ends of the runways and along the approach and departure flight paths have significant potential for aircraft accidents. Based on this analysis, DoD developed three zones that have high relative potential for accidents. The Clear Zone, the area closest to the end of the runway, is the most hazardous. The overall risk is so high that DoD generally acquires the land through purchase or easement to prevent development. Shaw AFB has acquired all land in the Clear Zones. The Clear Zones at Shaw AFB extend 3,000 feet from the ends of each of the two runways and 1,500 feet on each side of the center line of each runway, resulting in partially overlapping 3,000-by-3,000-foot zones at each end of the airfield (USAF 1994). The Clear Zones are mapped in Figure 3-9.

APZ I is an area extending off the base beyond the Clear Zone that has a significant potential for accidents; it extends 5,000 feet from the end of the Clear Zone. APZ II is an area beyond APZ I that has a measurable potential for accidents; it extends 7,000 feet from the end of APZ I. While the aircraft accident potential in APZs I and II does not warrant acquisition of these areas by the Air Force, land use planning and controls are strongly encouraged in these areas for the protection of the public (USAF 1994).

3.9.3.2 Airfield Clearance Requirements

Air Force regulations define areas on and around airfields that are to remain clear of obstructions. Hazards are identified in these areas, and development is restricted to promote aviation safety, minimize danger to people and facilities, and prevent hindrances to flight operations. Imaginary surfaces (planes and conical surfaces) extending above and away from the airfield have been identified to define the spaces within which aircraft operate. Criteria have been established to govern the location and height of structures in the vicinity of these surfaces. Air Force Manual 32-1123 (I), *Airfield and Heliport Planning and Design* (USAF 1999), specifies the clearance requirements for the imaginary surfaces, including the Primary Surfaces, Transitional Surfaces, and Inner Horizontal Surfaces (taxiways and aprons). Table 3-6 lists the clearance requirements for these surfaces.

Table 3-6. Airfield Clearance Requirements

Imaginary Surfaces	Clearance Requirements
Primary	1,000 feet from each side of runway centerline
Transitional	From the outer edge of the Primary Surface – a 7:1 slope ratio to an elevation of 150 feet
Taxiway	200 feet from the taxiway centerline
Aircraft Parking Apron	125 feet from the edge of the apron

Shaw AFB has established height and obstructions criteria, including clearance requirements specifying height limitations on structures in the vicinity of the airfield (USAF 1994). Obstacles that penetrate the imaginary surfaces are identified and evaluated for their impact on safety. Violations may involve obstacles that are either manmade (e.g., power lines) or natural (e.g., trees). Obstacles that are allowed to remain are included in one of three categories: permanent waivers, permissible deviations, or exemptions (usually based on the date of construction). Obstacles classified as deviations or exemptions do not require a waiver. Approximately 147 obstacles at Shaw AFB currently have permanent waivers, deviations, or exemptions (SAFB 1999). The base has an ongoing Airfield Obstruction Reduction Initiative to remove airfield obstructions from the runway environment and correct zone violations (SAFB 2004d).

3.9.4 Force Protection

Force protection is a security program designed to protect Air Force personnel, civilian employees, family members, facilities, and equipment, in all locations and situations. The program is accomplished through the planned and integrated application of antiterrorism measures, physical security, operations security, and personal protective services. It is supported by intelligence, counterintelligence, and other security programs. In response to terrorist attacks and the need to improve force protection, the DoD in the late 1990s required the development of antiterrorism/force protection (AT/FP) guidelines for new construction. That requirement was partially implemented in 1999 when the DoD promulgated AT/FP Construction Standards (DoD 1999) to ensure that force protection standards are incorporated into the planning, programming, and budgeting for the design and construction of Military Construction (MILCON) funded facilities. These standards are integrated at Shaw AFB into the new construction and major renovation projects to which they apply. Force protection at Shaw AFB also is maintained through the use of entry gates to control access to the base. Vehicles enter and exit the base through five security checkpoints: the Main Gate on Shaw Drive, the Polifka Street Gate, the Frierson Street Gate, the Sycamore Street Gate at the Palmetto Heights residential area, and the North Gate on Frierson Road (Byer 2004).

3.10 NOISE

Noise is defined as unwanted sound that either prevents or interferes with daily human activities. The response of individuals to noise varies depending on the type of noise, the duration of the noise, the time of day, the location, and the type of activity underway that is being interrupted. The primary source of noise at Shaw AFB is aircraft operations. Table 3-7 relates dB values to sounds commonly heard in our environment. The dB values presented in Table 3-7, and throughout this EA, are A-weighted levels. An A-weighted sound level of a noise represents the approximate frequency response characteristic of the average young human ear. The A-weighted sound level has been used extensively in this country for the measurement of community and transportation noises.

The AICUZ program has been developed in an effort to protect local citizens from the noise exposure and accident potential associated with flying activities and to prevent degradation of the Air Force's capability to achieve its mission by promoting compatible land use planning. The most recent AICUZ Study for Shaw AFB was published in 1994 (USAF 1994). This study provides noise contours associated with aircraft operations and promotes compatible land development in areas subject to aircraft noise. Because the same level of noise is more intrusive at night than it would be during the day, the Air Force uses the Day-Night Average Sound Level (Ldn or DNL) to describe noise. The Ldn averages the sound energy from aircraft operations over a 24-hour period and assigns an additional 10-dB penalty to noises that occur between 10:00 pm and 7:00 am. The noise contours mapped as part of the 1994 AICUZ Study for Shaw AFB were updated by ACC in February 2004. These current aircraft noise contours are shown in Figure 3-10. About 85 percent of the area within the installation boundary is within noise level zones that exceed the Ldn of 65 dB (the level of concern for residential land use).

The AICUZ Study (USAF 1994) defines compatible and non-compatible land uses adjacent to Shaw AFB. Generally, residential uses are considered incompatible within Ldn 75 dB. Below Ldn 65 dB, there are usually no restrictions on residential land uses due to noise. Areas between Ldn 65 dB and 75 dB may not qualify for federal mortgage insurance according to US Department of Housing and Urban Development (HUD) Regulations (24 CFR 51B). Moreover, residences may require additional noise attenuation measures incorporated into their construction.

Industrial and manufacturing uses are generally considered compatible with higher noise levels. Noise attenuation measures are recommended for portions of buildings committed to activities that need lower levels, such as scientific research, office space, and public reception areas. Commercial and business uses are compatible without attenuation to Ldn 70 dB and are considered incompatible at Ldn 80 dB and up. Between Ldn 70 dB and Ldn 80 dB, noise attenuation measures should be included in the design and construction of buildings. Public and quasi-public services require a quieter environment. These types of uses should be located outside the Ldn 65 dB contour or provide adequate noise level reduction (USAF 1994).

Table 3-7. Typical Decibel Levels of Familiar Sounds

dB	Sound
140	Airplane taking off
130	Power drill
120	Jet plane at ramp
110	Leaf blower, motorcycle
100	Loud rock band
90	Lawn mower, truck (50 feet)
80	City traffic, vacuum cleaner (5 feet)
70	Freeway traffic, freight train (100 feet)
60	Normal conversation
50	Light traffic (100 feet), large office
40	Quiet residential area
30	Soft whisper
20	Whispering (5 feet)
10	Normal breathing
0	Faintest audible sound

SSR 37

SSR 364

441

Spann Branch

Long Branch

Beech Creek

Booths Pond

Long Branch

Proposed Fighter Detachment Facility

76

378

441

Marsh Branch

Legend

- Streams
- Surface Water

Off-Base Land Use

- Commercial
- Housing (High Density)
- Housing (Low Density)
- Industrial
- Local Government Owned
- Public Schools
- Shaw Air Force Base
- Vacant/Agricultural

Source: SAFB (1999)

N

Feet
0 1,000 2,000

Figure 3-1
Existing Land Use Off-Base

Proposed Fighter Detachment Facility
Environmental Assessment
Shaw Air Force Base, South Carolina

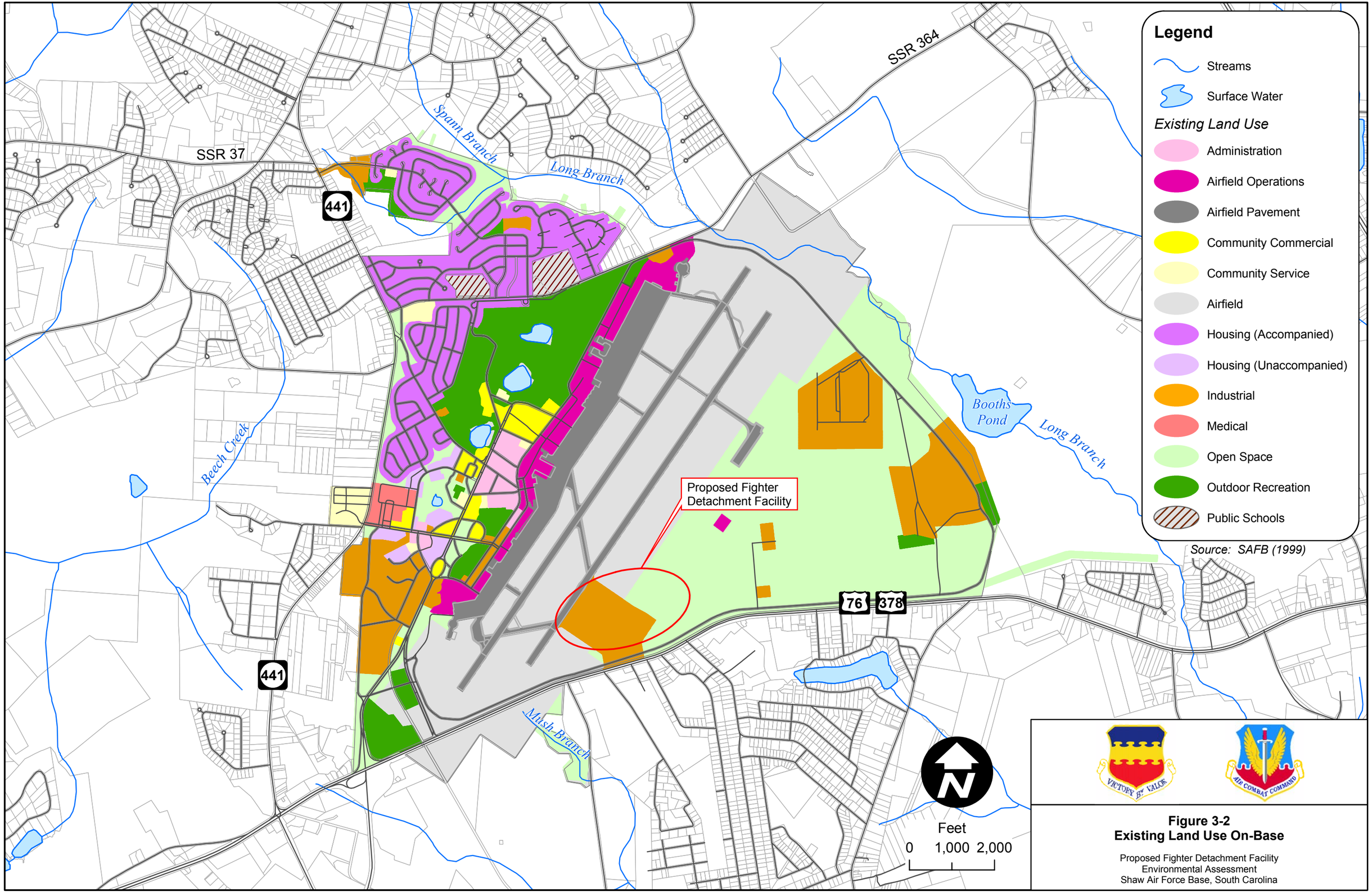


Figure 3-2
Existing Land Use On-Base

Proposed Fighter Detachment Facility
Environmental Assessment
Shaw Air Force Base, South Carolina

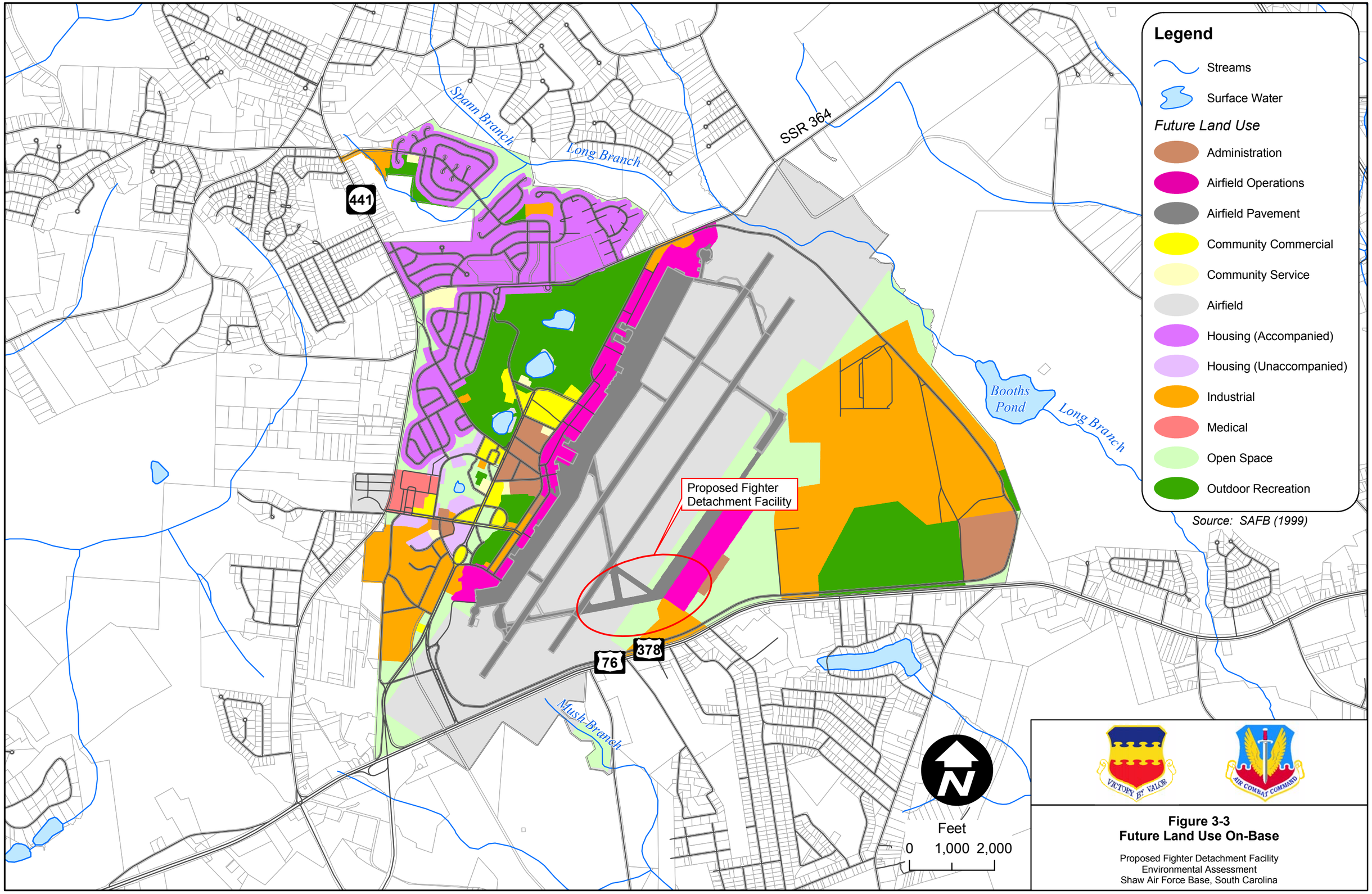
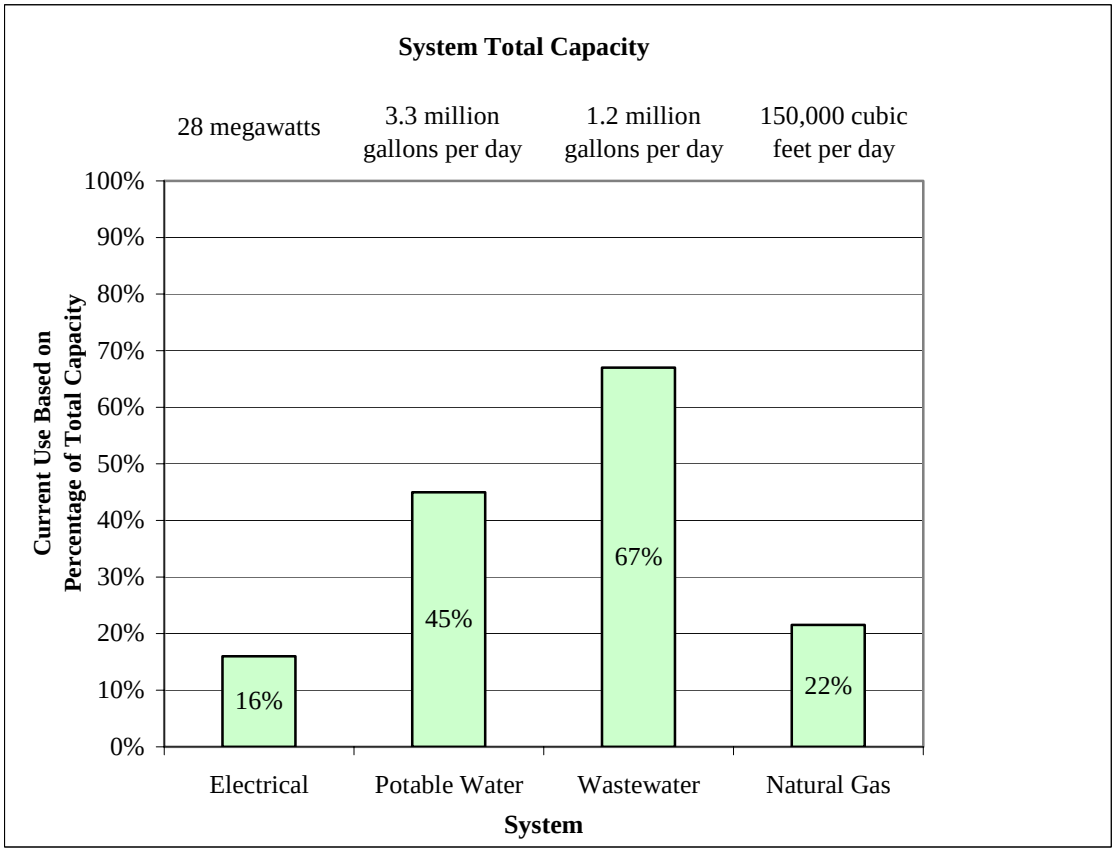


Figure 3-3
Future Land Use On-Base

Proposed Fighter Detachment Facility
Environmental Assessment
Shaw Air Force Base, South Carolina

Figure 3-4
Infrastructure System Capacities
Proposed Fighter Detachment Facility
Environmental Assessment
Shaw Air Force Base, South Carolina



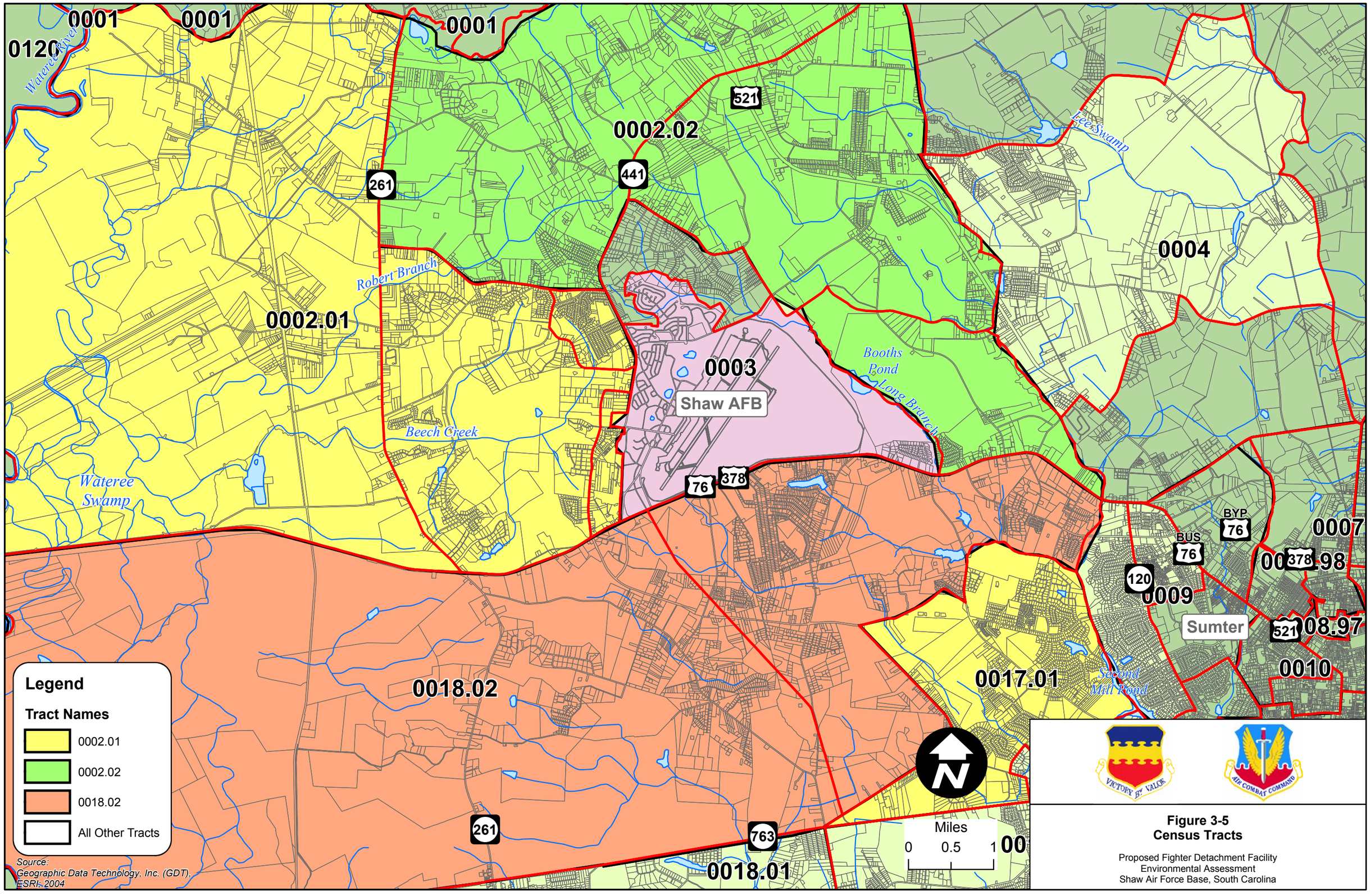


Figure 3-5
Census Tracts

Proposed Fighter Detachment Facility
Environmental Assessment
Shaw Air Force Base, South Carolina

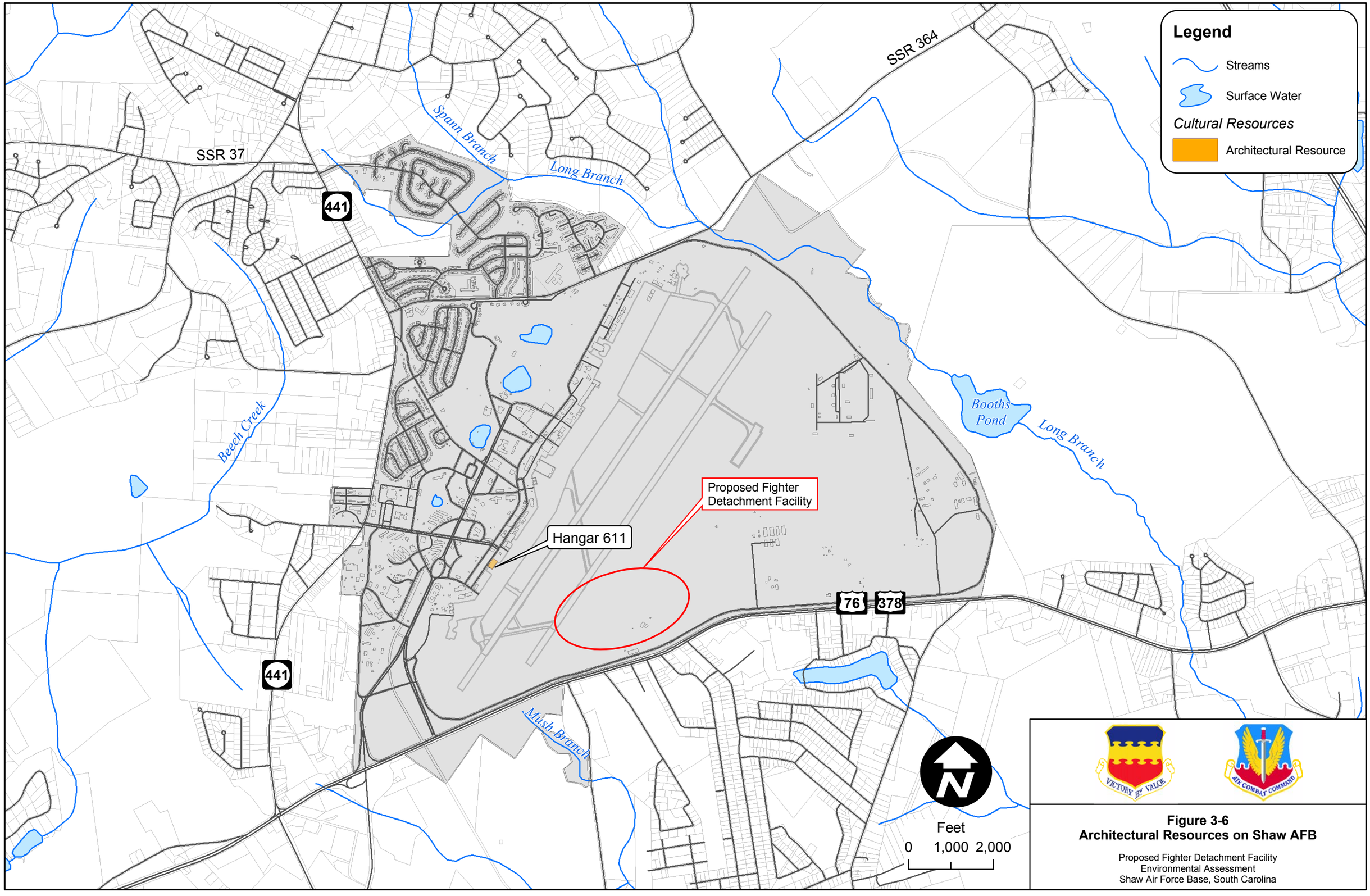


Figure 3-6
Architectural Resources on Shaw AFB

Proposed Fighter Detachment Facility
Environmental Assessment
Shaw Air Force Base, South Carolina

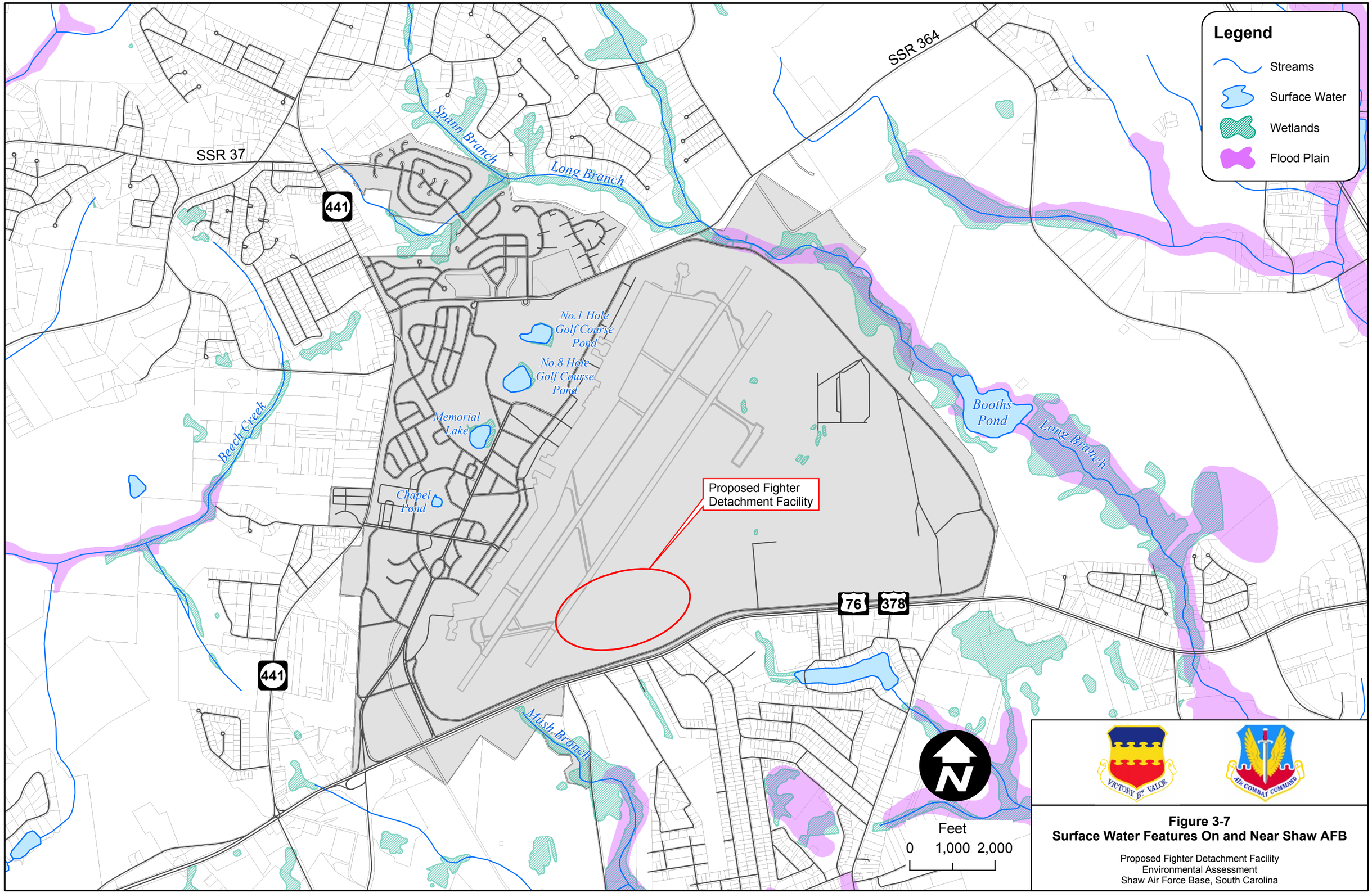


Figure 3-7
Surface Water Features On and Near Shaw AFB

Proposed Fighter Detachment Facility
Environmental Assessment
Shaw Air Force Base, South Carolina

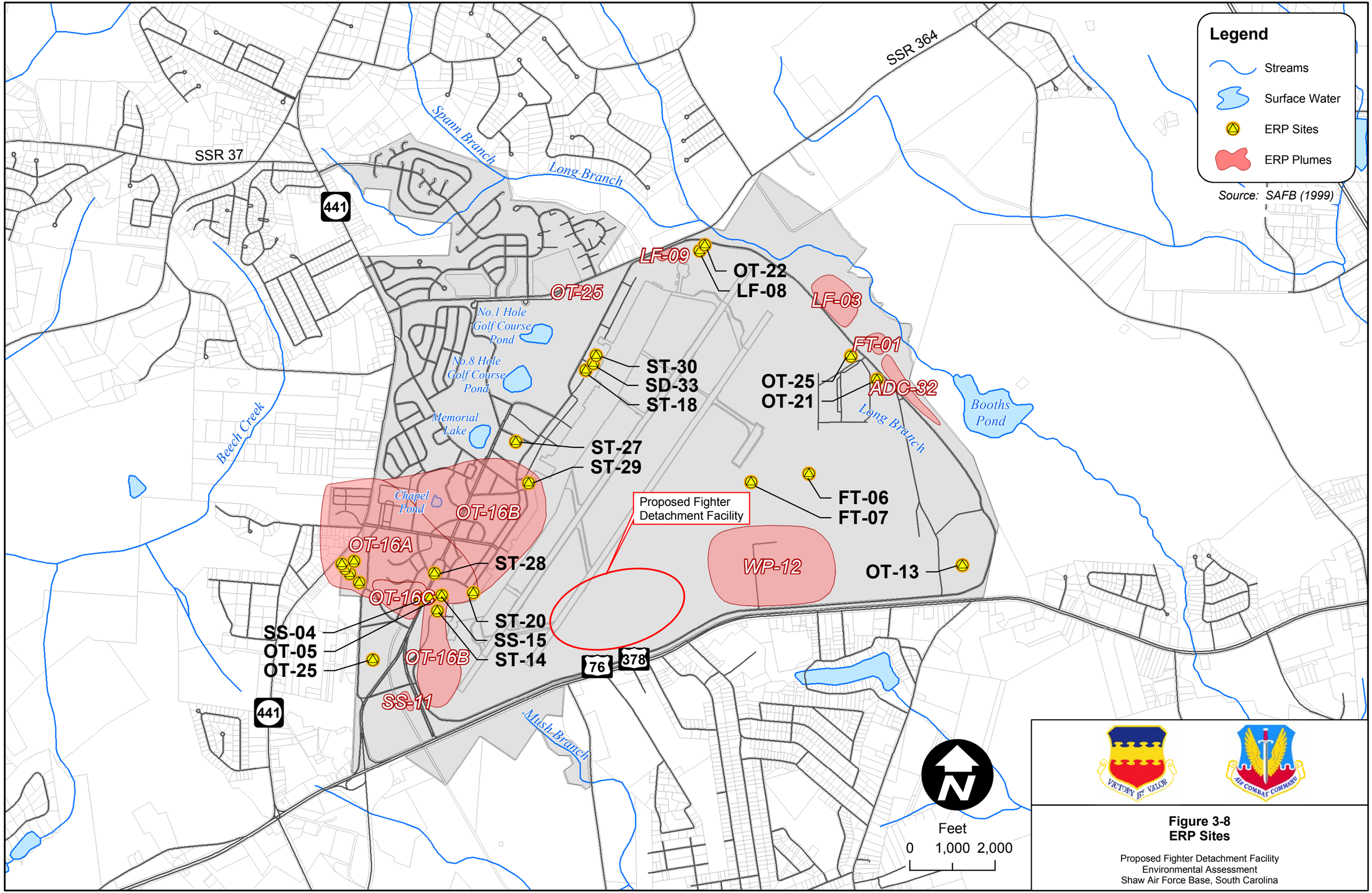


Figure 3-8
ERP Sites

Proposed Fighter Detachment Facility
Environmental Assessment
Shaw Air Force Base, South Carolina

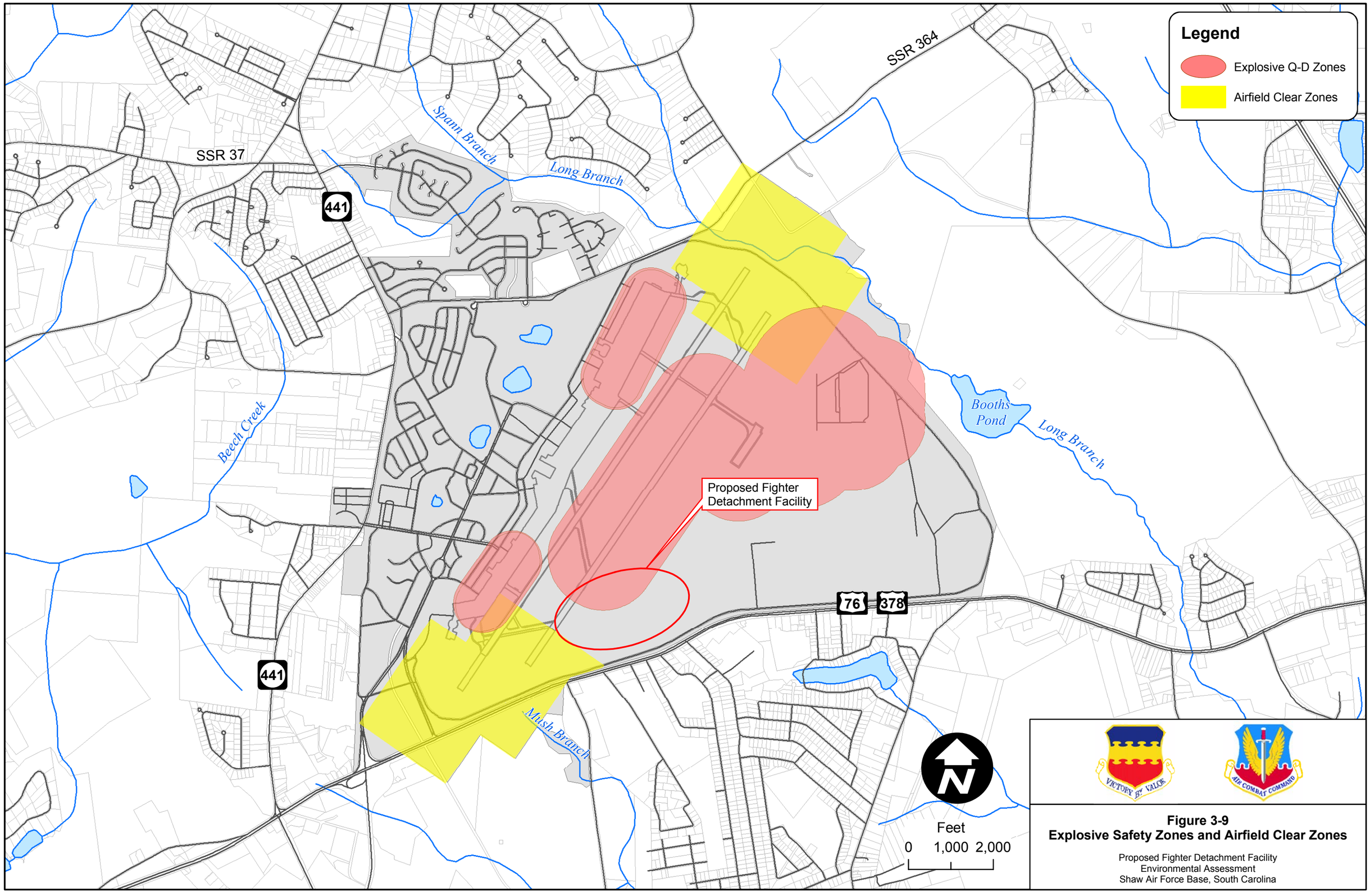


Figure 3-9
Explosive Safety Zones and Airfield Clear Zones

Proposed Fighter Detachment Facility
Environmental Assessment
Shaw Air Force Base, South Carolina

Legend

Current Noise Contours

65 to 70 dB

70 to 75 dB

75 to 80 dB

80 to 85 dB

85 dB and above

Wateree River

Robert Branch

Beech Creek

Wateree Swamp

Lee Swamp

Booths Pond

Long Branch

Second Mill Pond

Shaw AFB

Sumter

261

441

521

76

378

763

BYP 76

BUS 76

120

Miles

0 0.5 1

VICTORY BY VALOR

AIR COMBAT COMMAND

Figure 3-10
Current Aircraft Noise Contour Map

Proposed Fighter Detachment Facility
Environmental Assessment
Shaw Air Force Base, South Carolina

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter describes the environmental consequences from implementation of the No-Action Alternative and the Proposed Action, respectively. The consequences are discussed on the basis of the environmental resources described in Chapter 3, and in the same order. Within each section, the consequences of the No-Action Alternative are discussed first in order to provide a description of impacts currently occurring under existing, baseline conditions. The consequences of the Proposed Action then are described and compared to the consequences under the No-Action Alternative in order to determine the relative magnitude and significance of impacts under the Proposed Action. The CEQ Regulations implementing NEPA require evaluation of the significance of an impact based on both its context and intensity. The evaluation of the significance of an impact involves consideration of several contexts, including the consideration of local and regional effects and short-term and long-term effects. The significance of an impact also is evaluated with regard to its intensity or severity. The regulations provide ten considerations relevant to assessing the significance of impacts (40 CFR 1508.27):

> 1) Is the impact adverse or beneficial? 2) Does the impact affect public health or safety? 3) Does the area affected have unique characteristics such as historic or cultural sites, farmlands, parklands, wetlands, wild and scenic rivers, or ecologically critical areas? 4) Is the impact highly controversial? 5) Is the impact highly uncertain or unknown? 6) Does the effect of the action establish a precedent for future actions with significant effects? 7) Is the impact related to other impacts that are individually insignificant but cumulatively significant? 8) Does the impact adversely affect scientific, cultural, or historical resources? 9) Does the impact adversely affect an endangered or threatened species or its habitat? 10) Does the impact threaten a violation of federal, state, or local laws or regulations for the protection of the environment?

In the following sections, the level of impact of each alternative on each environmental resource is estimated, and those impacts determined to have more than a minor adverse effect are further evaluated with regard to their significance based on context and intensity. The evaluation includes consideration of mitigation measures, if relevant, so that the final assessment of impact is based on the remaining effects after mitigative factors have been taken into consideration. In addition, the possibility of significant impacts from cumulative effects that are not individually significant also is considered. Chapter 5 further addresses possible cumulative impacts from the Proposed Action in conjunction with other actions.

4.1 LAND USE RESOURCES

4.1.1 No-Action Alternative

Under the No-Action Alternative, land uses on Shaw AFB would remain essentially the same as under existing conditions. However, continued use of the temporary FD facility

on the northwest ramp would have adverse effects on land use in that area of the ramp and flight line.

Under the No-Action Alternative, the temporary FD facility would adversely affect available space for other operations on the northwest ramp. A new squadron operations facility is needed in that area. Also, current aircraft parking will be shifted north into this area due to the operational restructuring of the squadrons on the base, and the standoff required for aircraft wingtip clearance would consume additional ramp space. These uses of the northwest ramp would be adversely affected by the continued presence of the FD (SAFB 2004b).

The presence of the temporary FD facility in this area complicates aircraft operations on the northwest ramp due to the mix of the FD's continuous operations with the existing flying operations in this area. If the temporary FD facility were to remain in this area, installation of security fencing may be needed. However, this would block off the flight line road, which is the primary vehicle access to the north end of the ramp and is used for delivery of munitions, delivery of POL, and access to the new pod facility (SAFB 2004b).

Consequently, the No-Action Alternative would have adverse impacts on land use in the area of the northwest ramp. These impacts would continue to reduce operational efficiency in that area of the flight line, but the effects would not be significant in the context of the overall operations of the base.

Traffic flows entering/exiting the base and on the base would not change, and visual resources would not be adversely affected. Consequently, the No Action Alternative would not have significant adverse impacts on transportation or visual resources.

4.1.2 Proposed Action

Implementation of the Proposed Action would be consistent with the proposed land uses in the Shaw AFB *General Plan* (SAFB 1999). The Proposed Action would provide a new FD Facility south of the airfield to replace the existing temporary facility on the northwest ramp. The current land uses at the site of the Proposed Action are industrial and open space, and the planned future land uses at this site are airfield operations, industrial, and open space (SAFB 1999). The Proposed Action would be consistent with current and future land uses planned for the crosswind runway area and would have no significant adverse impact on land use.

Access to the proposed location of the FD Facility is via Patrol Road and an unpaved road. Under the Proposed Action, the unpaved road would be paved. Traffic potentially may be delayed on Patrol Road (south of the airfield) during construction activities. However, any such impact would not be significant due to its short-term, localized nature. After the completion of construction, the Proposed Action would not have a significant adverse impact on transportation facilities on or off the base.

The Proposed Action would improve the appearance of the flight line area by replacing the temporary structures currently serving the FD on the northwest ramp. At the proposed location of the FD Facility south of the airfield, some trees would likely need to be removed along the margin of the pine plantation. The pine plantation provides a visual barrier between the base and US 76/378. However, the area where pine trees would need to be cleared would be a small tract at the north edge of the forest adjacent to existing buildings at the site, and it would not be visible from the highway. Thus, the existing visual resources on the base would not be adversely impacted by the Proposed Action.

In summary, the Proposed Action would not have significant adverse impacts on land use resources, including land use on the base, transportation, or visual resources.

4.2 INFRASTRUCTURE

4.2.1 No-Action Alternative

Under the No-Action Alternative, current baseline demands on the infrastructure of Shaw AFB would continue as described in Section 3.2. Under current conditions, the capacities of all of the infrastructure systems and facilities are more than sufficient to meet existing demands, including demands of the temporary FD Facility, and this would continue under the No-Action Alternative. Assuming that ongoing maintenance, repair, and upgrade of infrastructure components continue and the quality of the systems and facilities is maintained, the level of impact of this alternative on the infrastructure of Shaw AFB would be negligible.

4.2.2 Proposed Action

Implementation of the Proposed Action would place minor additional demands on some infrastructure components at Shaw AFB. The net increase in building square footage that would result from the Proposed Action is estimated to be approximately 34,000 SF. Effects of the Proposed Action on each infrastructure system are described below.

4.2.2.1 Electrical and Natural Gas Systems

The Proposed Action would involve the construction of new buildings and would result in a minor increase in electricity usage. However, the electrical systems on base are served by two off-base suppliers and have reserves to meet future needs (SAFB 2004d). Adequate capacity is available within the base electrical system; current usage at peak periods is approximately 16 percent of capacity (Figure 3-4). Considering ongoing upgrades to the electrical system at Shaw AFB, this system is capable of supporting substantial growth on the installation (SAFB 1999).

The construction of additional buildings also would result in a minor increase in usage of natural gas for heating and cooling. A project is planned to extend the natural gas pipeline from the metering station, which divides the supply between the housing and

industrial areas, to the eastern portion of Shaw AFB (SAFB 1999). This would be necessary for the heating and cooling systems of the FD Facility and would result in a small increase in natural gas consumption on base. Nevertheless, the natural gas system has the capacity to support substantial growth at Shaw AFB.

4.2.2.2 Potable Water System

The water system is currently operating at approximately 54 percent of its capacity, and is therefore capable of supporting substantial growth on the base (SAFB 1999). The water system would have to extend to the site of the FD Facility to supply potable water, resulting in a negligible increase in water usage compared to baseline conditions. The additional personnel required for the new FD Facility (approximately nine individuals) would be minimal considering the overall population of the base, and the additional demand for potable water would likely be negligible.

4.2.2.3 Wastewater System

The small increase in personnel that would be associated with the operation of the proposed FD Facility is expected to result in a negligible net increase in wastewater flow from the base relative to existing conditions. Among the utilities that would be installed to support the FD Facility are a 10-inch sewer line and small lift station, which would connect the facility to an existing sewer main along the southern boundary of the base less than 2,000 feet south of the site (USAF 2004). Given that the current wastewater system is operating at 67 percent of its capacity (Figure 3-4), it is capable of supporting the minor increase in wastewater generation associated with the FD Facility.

4.2.2.4 Solid Waste Collection System

Solid waste generation is expected to increase during project construction. Following construction, however, the increase in solid waste produced by the operation of the new FD Facility is expected to be minimal.

4.2.2.5 Storm Drainage System

Construction of new buildings and paving of runways, taxiways, and roads under the Proposed Action will increase the existing on-base impervious area, creating more storm water runoff to be handled by the storm drainage system. The net change in impervious surface or "land under facilities" will determine the net change in storm drainage.

The existing impervious surfaces on Shaw AFB (e.g., runways, flight line, ramps, roads, parking lots, and buildings) cover approximately 30,884,040 SF (709 acres), or 21 percent of the total area of the base (3,354 acres). The increase in impervious surface area that would result from the Proposed Action is estimated at approximately 314,144 SF (7.2 acres), a one percent increase in the total area of impervious surfaces on the base. A 24-inch storm drain of reinforced concrete would be installed during construction of the FD Facility and would connect with the existing storm drainage system near the

southern perimeter of the base. The storm drainage system at Shaw AFB can handle substantial increases in flow (SAFB 1999). As discussed above, the net gain of impervious surfaces would be relatively small. Therefore, the current storm drainage system at Shaw AFB could support any increase in stormwater flow resulting from the FD Facility.

4.2.2.6 Heating and Cooling Systems

The Proposed Action would involve a minor increase in the need for additional heating and cooling capacity. The proposed FD Facility would be larger than the temporary facilities currently in use. However, the buildings and their heating and cooling systems would have energy efficient designs, and the overall change in demand for heating and cooling at Shaw AFB would be minor.

4.2.2.7 Liquid Fuels System

The Proposed Action would not appreciably change the demand on the systems used for storing and transporting liquid fuels on the base. Since the functions of the FD Facility are currently being performed at the temporary facilities on the base, consumption of liquid fuels, including jet fuel, gasoline, and diesel fuel, is expected to remain the same under the Proposed Action as under existing conditions.

4.2.2.8 Communications System

The Proposed Action would require minor reconfiguration of the communication system wiring. The new facility would require new system connections. However, the base communications system has adequate capacity to support existing demands as well as the minor increase in demand potentially associated with the Proposed Action.

4.2.2.9 Summary

There would be no significant adverse impacts from the Proposed Action on the infrastructure systems and facilities on Shaw AFB. As shown in Figure 3-4, the major utility systems on base have extensive available capacity remaining.

4.3 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

4.3.1 No-Action Alternative

Under the No-Action Alternative, the facilities included in the Proposed Action would not be constructed, and the effects of activities at Shaw AFB on population levels, employment, and earnings in the ROI would remain the same as described for the existing environment. Therefore, the No-Action Alternative would have no significant adverse impacts on socioeconomic conditions or environmental justice concerns.

4.3.2 Proposed Action

4.3.2.1 Socioeconomics

Construction and operation of the proposed FD Facility would have no appreciable effect on the population of Sumter County. The workers employed to construct the facilities are expected to be local or regional residents. Staff levels associated with the proposed facility would be similar to current levels, given that the functions of the FD Facility are currently being performed in temporary existing facilities on the base.

Economic activity associated with construction of the FD Facility would provide short-term benefits to the local economy. Construction of the proposed facility would require goods and services from the private sector within the Shaw AFB ROI and would have a minor beneficial effect on regional employment.

Operation of the FD Facility, once construction is complete, would provide a minor economic benefit to the Shaw AFB region. It is estimated that an additional nine individuals would be required to operate the FD Facility. Considering that Shaw AFB employs nearly 6,000 people, the Proposed Action would not appreciably alter long-term employment opportunities. Nevertheless, the Proposed Action would have a minor beneficial impact on socioeconomic resources.

4.3.2.2 Environmental Justice

Environmental justice, which concerns the disproportionate effect of a federal action on low-income and minority populations, focuses on residents living within the areas where there would be potentially adverse environmental impacts resulting from the Proposed Action. The proposed FD Facility is located within Shaw AFB and would have no adverse effects on any off-base areas. Accordingly, there would be no environmental justice issues associated with the Proposed Action.

4.4 CULTURAL RESOURCES

4.4.1 No-Action Alternative

Under the No-Action Alternative, the cultural resources of Shaw AFB would continue to exist and receive protection as described in Section 3.4. There would be no significant adverse impact on cultural resources as a result of the No-Action Alternative.

4.4.2 Proposed Action

There are no NRHP-listed cultural resources at Shaw AFB, and only one resource, Hangar B611, has been declared eligible for listing on the NRHP. This hangar is located near the southern end of the flight line approximately 3,600 feet west of the proposed FD Facility (Figure 3-6).

No eligible archaeological resources are located at Shaw AFB; however, one potentially eligible resource is located on the northern boundary of the base. Three archaeological sites on the base have not been assessed for NRHP eligibility (SAFB 2001b). However, these three sites (SU61, SU62, and SU63) are north and west of the airfield and are not located in proximity to the proposed FD Facility.

Under the Proposed Action, construction activities would be performed in an area adjacent to the airfield that has already been developed. In addition, all areas of the base have been surveyed for cultural resources, and the proposed facility would not be on or adjacent to known or potential cultural resource locations. If unanticipated cultural resources were to be encountered during construction, procedures outlined in the CRMP would be followed.

The Proposed Action would not impact known cultural resources on Shaw AFB, and there is only a minimal potential for the Proposed Action to impact undiscovered cultural resources on the base as a result of excavation during construction activities. Thus, the Proposed Action would have no significant adverse impact on cultural resources. Concurrence with this conclusion was received from the SHPO following their consultation and review of the Draft EA (see Appendix A).

4.5 BIOLOGICAL RESOURCES

This section describes the consequences for the biological environment at Shaw AFB from the implementation of each alternative.

4.5.1 No-Action Alternative

The No-Action Alternative would result in negligible to low levels of impact on various attributes of the biological environment of Shaw AFB and surrounding areas.
The existing habitat types and associated flora and fauna of the base would be impacted at negligible to low levels by the No-Action Alternative. The presence of the base and the performance of the many operational activities essential to its missions inevitably have adverse effects on certain species and habitats. Continuation of current mission activities and use of current facilities would be expected to continue to affect communities and species, both terrestrial and aquatic.

Aquatic communities would continue to be impacted at low levels by stormwater runoff from existing facilities and other discharges to water bodies. Soil erosion can impact stream habitats, and aquatic habitats and their biota also may be affected by the discharge of wastewaters from the base. All wastewaters, other than stormwater runoff, are treated prior to their discharge. The permitted treatment facilities would continue operating under the No-Action Alternative; therefore, wastewater discharges would have only a low level of impact on aquatic habitats and biota.

Terrestrial communities and their biota would be affected by ongoing natural resource management and landscape maintenance activities on the base. Overall, continued

implementation of these management practices at existing facilities would have impacts on existing communities and biota of the base ranging from beneficial to negligible.

As discussed in Section 3.5.3, only one ETSC species, the least tern, occurs on Shaw AFB. This threatened species is being monitored on the base, and efforts are being made to minimize disturbance to the colony site (SAFB 2001d). The continued operation of the temporary FD facilities on the northwest ramp would not impact this species.

In summary, evaluation of the ecological effects that would continue to occur under the No Action Alternative indicates that there would not be significant adverse impacts on biological resources.

4.5.2 Proposed Action

Implementation of the Proposed Action would result in negligible changes in the levels or types of impacts to biological resources that were previously described under the baseline conditions of the No-Action Alternative. The proposed FD Facility would be located in an area on the south perimeter of the airfield that has already been developed and is of limited habitat value. It is unlikely that activities under this alternative would adversely affect resident wildlife sufficiently to reduce population levels, although distributions of species on the installation may be temporarily affected as sensitive species avoid areas of high noise exposure from construction activity.

The Proposed Action would not be located in a wetland area (Figure 3-7), and effects on ETSC species under this alternative would be essentially the same as described for the No-Action Alternative. The only ETSC species recorded on Shaw AFB, the least tern, has previously nested on the roof of the BX building, which is across the runway and 2,500 feet northwest of the proposed FD Facility. Given the terns' selection of a nesting site in a very active area of the base and closer to the flight line than the proposed facility location, construction and use of the FD Facility is not expected to adversely affect the least tern population on the base. Thus, there would be no adverse impacts on wetlands or ETSC species from the Proposed Action. Concurrence with the conclusion concerning ETSC species was received from USFWS following their consultation and review of the Draft EA (see Appendix A).

The consequences of the Proposed Action for the biological resources of Shaw AFB would not differ appreciably from those of the No-Action Alternative. Certain species may be impacted at a low level under the Proposed Action by effects from construction activities, such as land clearing for new construction, sedimentation, tree removal, or noise. However, evaluation of the context and intensity of these ecological effects indicates that they would not result in significant impacts on biological resources. This conclusion was supported by SCDNR, who reviewed the Draft EA and commented that they believe the Proposed Action can be accomplished with minimal impacts to natural resources (see Appendix A).

4.6 WATER RESOURCES

4.6.1 No-Action Alternative

Under the No-Action Alternative, ongoing monitoring and permitting of wastewater and stormwater discharges to surface waters in the vicinity of the base would continue, and ongoing programs to prevent spills and other sources of groundwater contamination would continue. Consequently, there would be no significant adverse impacts to water resources under the No-Action Alternative.

4.6.2 Proposed Action

The construction of the proposed FD Facility would involve activities such as clearing of vegetation, grading, and construction of new buildings, pavement, and fencing. These activities have the potential to affect water resources and their ecological functions. Grading has the potential to alter overland flow due to changes in slope, increase land surface erosion, increase sediment load in surface waters, decrease water storage, and alter biogeochemical cycling by changing soil permeability characteristics. Construction may result in an increase in impervious surface in a given location, which can cause increased runoff volume and velocity, loss of functions associated with vegetative cover, and loss of water storage.

Impacts from clearing and grading would be temporary. Re-establishment of vegetation and stabilization of disturbed soils would minimize impacts caused by those activities. Certain impacts on water resources from construction would be ongoing during the life of the facility; for example, increases in impervious surfaces and resulting stormwater runoff, losses of vegetative cover, and reductions in water storage capacity. These effects would be cumulative if additional projects are constructed in the vicinity.

However, given that the Proposed Action would be located in a moderately developed area of the airfield that is already partially paved, actual impacts on water resources from the Proposed Action would be minimal. The majority of the unpaved areas of the proposed site are covered by grass. Sedimentation may temporarily occur during grading operations, but these impacts would be mitigated with appropriate erosion and sedimentation control measures. Stormwater runoff from this area of the base enters Mush Branch through NPDES-permitted stormwater outfall 003 and Long Branch through NPDES-permitted stormwater outfall 004 on the base perimeter, and monitoring of these discharges would continue under the Proposed Action.

Infiltration would decrease and runoff would increase after the completion of construction. However, the changes in overall volumes of stormwater and wastewater discharged, and their ultimate effects on the surface waters at Shaw AFB are expected to be minimal. As discussed in Section 4.2.2, the net gain of impervious surface that would result from the Proposed Action is estimated to be approximately 7.2 acres (314,144 SF), a minor increase of one percent in the 709-acre total impervious area of the base. All

construction activities would occur outside of the limits of the 100-year floodplain (SAFB 1999).

In compliance with the Shaw AFB Stormwater Pollution Prevention Plan (SWPPP) (SAFB 1998), prior to the start of any construction, silt fences, storm drain inlet and outlet protection, and other pollution prevention construction practices would be used to prevent erosion, sedimentation, and stormwater or other discharges from the site. The proposed FD Facility would be designed in accordance with AFI 32-7041 (Water Quality Compliance), and design of the project is expected to include stormwater management features to remove sediment and other pollutants, reduce flow velocities, and promote rapid infiltration and sheet flow rather than channelization. Because the proposed construction project would disturb more than one acre of land, a construction NPDES permit would be required in addition to the base's current general NPDES permit (SCDHEC 2001). Additionally, modifications to the existing SWPPP may be necessary with regard to control of sedimentation, erosion, and stormwater discharges.

Groundwater in the vicinity potentially could be adversely affected by increases in impervious surface area as a result of the Proposed Action, which could reduce infiltration of stormwater and recharge of aquifers in the project area. However, as mentioned above, the area of impervious surface on the base is expected to increase only minimally as a result of the Proposed Action. Compliance with the updated SWPPP would continue, and stormwater management systems implemented in conjunction with the proposed project, such as stormwater detention basins, would reduce any impacts on groundwater recharge.

In summary, the Proposed Action would not have significant adverse effects on water resources. This conclusion was supported by SCDNR, who reviewed the Draft EA and commented that they believe the Proposed Action can be accomplished with minimal impacts to natural resources (see Appendix A).

4.7 AIR QUALITY

Air emissions resulting from the Proposed Action and No-Action Alternative were evaluated in accordance with federal and state air pollution regulations. The air quality impacts from a proposed activity or action are considered significant if they:

- Increase ambient air pollution concentrations above any NAAQS;
- Contribute to an existing violation of any NAAQS;
- Interfere with or delay timely attainment of NAAQS; or
- Impair visibility within any federally mandated PSD Class I area.

The base holds a state air permit that authorizes construction and operation of air emission sources as specified in the permit.

4.7.1 No-Action Alternative

Under the No-Action Alternative, the FD would continue using the temporary facilities on the northwest ramp, the new FD Facility would not be constructed, and air emissions would remain the same as under existing conditions. Consequently, there would be no significant adverse impacts to local or regional air quality under the No-Action Alternative.

4.7.2 Proposed Action

4.7.2.1 Operational Air Emissions

The Proposed Action would not substantially change existing operational emissions and, therefore, would not increase ambient concentrations of air pollutants in Sumter County. Functions performed at the FD Facility would replace functions currently being performed on the base at existing temporary facilities.

Sumter County is designated as "attainment" for meeting the national and state ambient air quality standards for the criteria pollutants. There are no PSD Class I areas near Shaw AFB. There is no substantial increase or change in operational activities associated with the Proposed Action that would adversely affect air quality in Sumter County. There would be no increases or changes in aircraft types or quantities, aircraft maintenance operations, base operations, or base facility maintenance operations, and the number of base personnel using motor vehicles would change minimally based on the number of additional personnel (nine) that likely would be added under the Proposed Action.

The Shaw AFB Title V Operating Permit requires the base to annually report an air emissions inventory. In addition, it requires a new permit for any changes of equipment or fuel listed in the permit or the relocation of equipment listed in the permit. The Proposed Action would not require a new permit.

Consequently, air emissions associated with operation of the FD Facility under the Proposed Action would not have a significant adverse impact on air quality.

4.7.2.2 Construction Air Emissions

Construction activities associated with the FD Facility at Shaw AFB would include grading, paving, and construction of facilities. It is assumed that these construction activities would occur over approximately a one-year period. These activities would produce short-term emissions primarily from internal combustion engines, asphalt concrete paving, fugitive dust, and architectural surface coatings, which would cease once construction is completed.

Solvents used in architectural surface coatings create VOCs that are emitted during application and as the coating dries. Since the use of organic solvents in architectural

surface coatings is the primary source of emissions, using low-solvent-content waterborne and powder coatings can minimize emissions from this source.

Asphalt concrete is grouped into three general categories: hot-mix, cutback, and emulsified. Hot-mix asphalt use produces minimal emissions of VOCs and HAPs while cutback asphalt produces high VOCs and HAPs. Emulsified asphalt produces less VOCs and HAPs than cutback asphalt. The paving associated with the proposed facility is anticipated to use hot-mix asphalt to minimize emissions and to use emulsified asphalt only when the use of hot-mix asphalt is not practical.

Soil characteristics affect the emission of soil particulates during construction. A soil survey has not been conducted on the base. However, based on descriptions of the soils surrounding the base, the soils on the base are expected to be sandy-textured (USDA 1974). Sandy-textured soils have a low potential to become airborne particulates. In addition, the climate of the area is humid and moist, which helps to minimize dust generation. Disturbed soil can be kept moist in accordance with construction specifications by using water trucks and sprinklers to further control the generation of fugitive dust during grading activities.

Internal combustion engines in construction equipment are the major source of construction-related emissions. Non-road, diesel-powered, construction equipment currently has minimal emission controls. (However, such equipment will have substantial improvements starting with the 2008 model year and non-road diesel fuel will be substantially cleaner starting in 2007.)

A simple dispersion model was used to provide an approximate measure of the impact of construction-related air emissions on the air shed over the base. Appendix B presents the data and assumptions used to calculate construction-related emissions. The impact of construction emissions is expected to be small due to the relatively small scale of the proposed project coupled with the limited time period in which project construction would take place. Because of these factors, a simplified analysis was conducted, and the results were sufficient to demonstrate that the impact of construction emissions at the base would be negligible.

Because internal combustion engines from construction equipment are the major source of emissions and the dispersion model is conservative, only internal combustion engine emissions were modeled (i.e., hydrocarbon [HC], CO, NOx, PM_{10}). Table 4-1 shows the maximum air pollutant concentrations at the base associated with construction of the proposed facility (i.e., calculated 1-hour concentrations of construction equipment emissions). In order to estimate the incremental effect of construction-related air emissions on local air quality, Table 4-1 also presents existing levels of the four modeled air pollutants (i.e., maximum ambient air monitoring values from the state), the total resulting concentrations (i.e., the calculated 1-hour concentration added to the existing ambient air concentration), and the percent increase in concentration estimated to result from construction-related emissions. The applicable federal and state air quality standards are provided for comparison.

Table 4-1. Evaluation of Construction-Related Air Emissions

Pollutant	Existing Ambient Air Monitor Value[a] (mg/m^3)	Calculated 1- hour concentration of construction equipment emissions (mg/m^3)	Total Resulting Concentration (mg/m^3)	Percent Increase in Concentration	Federal and State Standard (mg/m^3)
HC	n/a	0.0000000037	n/a	n/a	none
CO	5.27[b]	0.0000000095	5.27	< 0.001%	40
NO_x	0.026[c]	0.0000000439	0.026	< 0.001%	0.100
PM_{10}	0.035[d]	0.0000000020	0.035	< 0.001%	0.05

[a] from EPA Monitor Values Report for South Carolina, Year 2003 (USEPA 2004)
[b] Maximum recorded 1-hour value, Site ID 450190005 (Charleston)
[c] Maximum recorded annual mean for NO_2, Site ID 450450008 (Greenville)
[d] Maximum recorded annual mean, Site ID 450790018 (Columbia)
n/a Not available

The calculated 1-hour concentrations resulting from construction emissions represent a negligible (much less than 0.001 percent) increase over the ambient concentrations, and the resulting total concentrations are well below the federal and state standards. These results were obtained using a simple model and several conservative approximations.

It can be concluded that the air quality effects of construction activities would be negligible both in the immediate vicinity of the base and in surrounding areas. Therefore, the construction-related effects of the Proposed Action would not result in significant adverse impacts on air quality.

4.8 HAZARDOUS MATERIALS AND WASTE MANAGEMENT

4.8.1 No-Action Alternative

Under the No-Action Alternative, management of hazardous materials and wastes on Shaw AFB would continue as described in Section 3.8. No significant adverse impacts are expected under the No-Action Alternative.

4.8.2 Proposed Action

Construction of the FD Facility may require the use of hazardous materials by contractor personnel. In accordance with the base's HMMP, copies of Material Safety Data Sheets must be provided to the base and maintained on the construction site. The base would maintain any hazardous materials used by base personnel in the operation of the facility, and no adverse environmental consequences are anticipated. Project contractors would comply with federal, state, and local environmental laws and would employ affirmative procurement practices when economically and technically feasible.

Contractor personnel may generate hazardous waste, such as paints, adhesives, and batteries, during construction of the FD Facility. Storage and disposal of these wastes would be the responsibility of the site contractor and the base hazardous waste program. No existing USTs would be affected by the Proposed Action, and no ERP sites are located near the proposed location of the FD Facility (Figure 3-8). Appreciable amounts of hazardous wastes are not anticipated to be generated by base personnel during the operation and maintenance of the proposed FD Facility, and no significant adverse impacts associated with hazardous material and waste management on Shaw AFB are expected.

4.9 SAFETY

4.9.1 No-Action Alternative

The No-Action Alternative would result in the continuation of existing safety conditions at Shaw AFB, as described in Section 3.9. Due to the extensive safety programs and measures currently in place at Shaw AFB, there is a low level of hazard to military and civilian personnel on the base and in the region.

General operational safety would continue to be maintained through adherence to safety regulations prescribing measures, processes, and procedures to ensure safe operations in all aspects of daily activities on the base.

Current safety provisions regarding munitions storage and handling would continue as described in Section 3.9.2, and explosive safety (Q-D) zones would continue to be maintained around those areas on the base where munitions are stored and handled, including the temporary FD facilities on the northwest ramp. Current flight safety procedures and requirements under the No-Action Alternative, including airfield clearance requirements, airspace safety provisions, and maintenance of safety zones at each end of the airfield, would continue as described in Section 3.9.2. Also, force protection under the No-Action Alternative would continue as described in Section 3.9.2. In summary, the No-Action Alternative would have no adverse effects on general operational safety, munitions safety, and force protection on Shaw AFB.

4.9.2 Proposed Action

4.9.2.1 General Operational Safety

Under the Proposed Action, new facilities would be constructed and some existing facilities would be modified or upgraded. However, no construction or modification activities would involve any unusual or extraordinary techniques. During construction, best management practices would be employed, and standard industrial safety requirements and procedures would be enforced, thereby minimizing any safety risks associated with these activities.

Construction of the proposed project would involve activities that could expose workers performing the required site preparation, grading, and building construction to some risk. The U.S. Department of Labor (DOL) Bureau of Labor Statistics maintains data analyzing fatal and non-fatal occupational injuries based on occupation. Due to the varying range of events classified as non-fatal injuries, the considerations described below focus on fatal injuries since they are the most catastrophic. Data are categorized as incidence rates per 100,000 workers employed (on annual average) in a specific industry, categorized by a Standard Industrial Classification (SIC).

In the assessment of relative risk associated with the proposed construction project, it was assumed that the industrial classification of the workers involved is the Construction Trades (SIC 15, 16, and 17). In 2002, there were 1,121 construction-related fatalities, and the DOL calculated an incidence rate of 12.2 fatalities per 100,000 employed. Given the limited size and duration of the construction project included in the Proposed Action and the expectation of strict adherence to all applicable occupational safety requirements by construction workers on the base, the relatively low risk associated with these construction activities would be further minimized.

4.9.2.2 Munitions Safety

Munitions safety under the Proposed Action generally would continue as described under existing conditions in Section 3.9. Existing munitions storage and maintenance facilities could absorb the additive requirements of the FD operation, and no capacity increases would be required. A Q-D zone would be established around the FD Facility based on the Q-D requirement for the aircraft. This Q-D zone would not encompass or interfere with other facilities or activities in the vicinity. Ordnance and munitions currently in use by the FD at the temporary facility would continue to be used at the proposed FD Facility as under existing conditions.

4.9.2.3 Aviation Safety

Current flight-safety practices, including airfield clearance requirements, airspace safety provisions, and maintenance of safety zones at each end of the airfield, would not be affected by the project included in the Proposed Action. The proposed project would not violate airfield clearance requirements, and would not violate or encroach upon the Clear Zones at the ends of the runways.

4.9.2.4 Force Protection

Under the Proposed Action, safety related to force protection would be increased. The facility would be surrounded by a security fence (SAFB 2004b) and the 20th Security Forces Squadron, augmented by Army National Guard personnel, would provide security for the facility.

4.9.2.5 Summary of Safety Consequences

Under the Proposed Action, general operational, munitions, and aviation safety would not be appreciably impacted, but force protection would be beneficially impacted. Thus, the overall impact of the Proposed Action on safety at Shaw AFB would be beneficial.

4.10 NOISE

4.10.1 No-Action Alternative

Under the No-Action Alternative, the temporary FD facilities would continue current operations, and existing noise levels on and in the vicinity of Shaw AFB would remain the same as under current conditions. The No-Action Alternative would have no significant adverse impact on the noise environment at Shaw AFB.

4.10.2 Proposed Action

Operational and temporary construction impacts were considered in assessing the effects of the Proposed Action on noise. Operational impacts are defined as noise impacts associated with operations at the proposed FD Facility. Temporary construction impacts are defined as impacts that occur only during the construction of the facility. Impacts from operational and temporary construction noise are discussed in detail in Sections 4.10.2.1 and 4.10.2.2, respectively.

4.10.2.1 Operational Noise

The Proposed Action is not anticipated to create additional operational noise that would impact land uses adjacent to Shaw AFB. The temporary FD facilities are operational at Shaw AFB under existing conditions and the FD aircraft already are present. Thus, the Proposed Action would not alter the number or type of aircraft flown at the base, flight patterns or frequencies, or the aircraft noise contours. Therefore, no land uses adjacent to Shaw AFB would be affected by daily operational noise resulting from the FD Facility.

Operational noise impacts within Shaw AFB would not be significantly different from noise levels currently experienced, though noise from aircraft on the ground would increase in the vicinity of the facility at the crosswind runway area in the southern part of the airfield. Construction methods for the building would incorporate noise reduction measures consistent with its use and its location near the 80 dB Ldn noise contour on the base. Thus, the Proposed Action would have no significant adverse impact on the noise environment in regard to operational noise impacts. (As mentioned in Section 3.10, dB values presented in this EA are A-weighted levels.)

4.10.2.2 Temporary Construction Noise

Temporary construction noise impacts are anticipated during the period of construction of the FD Facility. These impacts would be of relatively short duration and would be

confined within the boundaries of Shaw AFB. The procedure used to quantify temporary construction noise impacts is described below.

Building construction noise includes noises associated with typical building construction. Noise levels typical of equipment used in construction were used to determine the Ldn. Noise impacts would actually vary over time as the project progresses through different construction phases. The equipment and noise levels are presented in Table 4-2.

Table 4-2. Noise Levels of Construction Equipment

Noise Category	Equipment	Sound Level (dB)*
Building Construction	Backhoe	93
	Hammer	95
	Portable saw	102

* Noise levels from "Construction Noise Hazard Alert", The Center for Protection of Workers' Rights, Building and Construction Trades Department, AFL-CIO. Presented in decibels in A-weighted scale and assumes human receivers adjacent to equipment. Sound levels shown are the upper ends of the range.

In order to calculate the Ldn, it was assumed that no construction work would occur between the hours of 10:00 pm and 7:00 am. Therefore, the 10 dB penalty associated with noise occurring within these hours was not applied. In addition, the workday was assumed to be nine hours long. Table 4-3 presents the exposure factors used and the resultant Ldn.

Table 4-3. Construction Noise Model Exposure Factors

Noise Category	Exposure Duration by Source	Ldn (dB)*
Building Construction	Backhoe only for 1 hr Portable saw only for 2 hrs Hammer only for 2 hrs Hammer and saw for 2 hrs No major noise activities for 2 hrs	93

* Assumes equipment noise is constant through hours of operation noted.

Based on the Ldn and a point source model, noise contours were calculated for the construction noise for the facility (Table 4-4). Peak construction noise levels would dominate the AICUZ aircraft noise contours in the immediate vicinity of the construction activity. As the noise energy from the site dissipates with distance, the AICUZ contours will best represent the noise environment. Again, it should be noted that the construction noise contours reflect temporary impacts and are not long-term.

Table 4-4. Temporary Construction Noise Contours

Noise Category	Temporary Construction Noise Contours	
	Ldn Contour (dB)	**Distance from Source (feet)**
Building Construction	80	58
	75	103
	70	182
	65	325

Based on these temporary construction noise contours and the location of the proposed facility, it was determined that no residential or outdoor recreation uses would experience greater than 65 dB of construction noise, and no commercial or business uses would experience greater than 70 dB of construction noise. The project would be located in an area designated for airfield, industrial, or aircraft operations and maintenance. Airfield, industrial, and aircraft operations and maintenance facilities were not evaluated for construction noise impacts because of the existing elevated noise levels of their operating environments.

In addition to the noise impacts listed above, increased heavy truck traffic during construction would contribute to the overall noise associated with the Proposed Action. No specific noise attenuation is recommended since these construction noise impacts are temporary and will be of relatively short duration.

In summary, although some temporary adverse noise impacts are anticipated to occur, they are not considered significant, and the Proposed Action would have no significant adverse impact on the noise environment at Shaw AFB.

5.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

5.1 CUMULATIVE EFFECTS

5.1.1 Definition of Cumulative Effects

Cumulative effects are impacts that result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions regardless of the agency (federal or non-federal) or person undertaking such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). The cumulative effects of an action may be undetectable when viewed in the individual context of direct and indirect impacts, but nonetheless can add to other disturbances and eventually lead to a measurable environmental change.

5.1.2 Past, Present, and Reasonably Foreseeable Actions

Shaw AFB has been an active military installation since its establishment in 1941. It has subsequently undergone continuous development as its missions and operational requirements have evolved. Past actions during the historical development and operation of the base have created the environment in which either the Proposed Action or the No-Action Alternative would occur.

Present actions on Shaw AFB involve ongoing operational activities, maintenance of existing facilities, and construction of new facilities. The operations of the FD from temporary facilities on the northwest ramp, as well as these other actions, would continue under the No-Action Alternative, and any environmental impacts associated with these actions also would continue. Under the Proposed Action, the construction of the FD Facility would result in limited environmental impacts as described in Section 4, and these impacts would be in addition to the limited impacts from other projects under construction on the base as well as ongoing base operations.

Five major projects currently planned or underway at Shaw AFB potentially could have cumulative impacts in conjunction with the Proposed Action and are described below.

- Construction of multiple projects included in the Wing Infrastructure Development Outlook (WINDO) Plan for Shaw AFB (SAFB 2004d). At least 17 WINDO projects are scheduled to begin by FY 2006. Twelve of these projects would serve to enhance or repair existing facilities on base, replace a temporary or inadequate structure with a permanent structure, or, in the case of the Memorial Lake Amphitheater, provide a new facility. The remaining five proposed projects are related to improvements to the Main Gate on Shaw Drive and lighting enhancements at all entrances to the base for the purposes of improving safety, security, and appearance.

- Construction of a new Readiness Complex: Three facilities are planned to comprise the new Readiness Complex, including a Disaster Preparedness Facility (5,370 SF), Mobility Storage Warehouse (6,700 SF), and Airfield Pavement Training Area (4.6 acres). The Readiness Complex location is southeast of the runway and approximately 1,800 feet east of the proposed location of the FD Facility.
- Privatization of military family housing: On-base military housing (1,702 units) would be conveyed to a private contractor, who would conduct renovation, demolition, and construction over a seven-year period, resulting in a total of 1,447 housing units on the base. The base housing areas are located in the northwest part of the base more than 1.2 miles from the proposed location of the FD Facility.
- Repair of the base perimeter fence line and construction of a perimeter patrol road: This project would have a linear footprint along the perimeter fence line of the base and would include clearing vegetation from a buffer along the fence, posting of warning signs, and construction of a perimeter road for security patrols. The proposed location of the FD Facility is more than 600 feet inside the base perimeter.
- Construction of an extension to the Shaw AFB WWTP sewer line outfall from its existing discharge into Beech Creek to a new location on the Wateree River. This project would allow the base to meet current discharge limits for copper due to the higher flow of the receiving stream. The sewer line project would be located west of the base perimeter with its origin at the current Beech Creek outfall, approximately 3,000 feet west of the western perimeter of the base and almost two miles west of the proposed location of the FD Facility.

Given the localized nature of construction-related impacts and the distance between project sites, there would not be significant, cumulative, construction-related impacts from the Proposed Action and any of the other projects. In addition, neither the Proposed Action nor any of the five projects would individually have significant long-term impacts on any of the environmental resources at Shaw AFB. Given that the context and intensity of the effects of these projects individually are not predicted to approach the threshold of a significant impact, their cumulative effects similarly are not expected to be significant.

Reasonably foreseeable future actions on Shaw AFB under either the Proposed Action or the No-Action Alternative are expected to include continued performance of the FD activities and maintenance of FD equipment and facilities, whether temporary or permanent. Numerous projects have been identified as being needed and are programmed for future implementation, including those on the Shaw AFB Facility Board List and included in the WINDO Plan (SAFB 2004d).

5.1.3 Analysis of Cumulative Impacts

The Proposed Action involves the construction of a permanent facility to support the FD at Shaw AFB. This FD Facility would replace an existing, temporary FD facility that is currently used. The proposed facility would represent an enhancement and expansion of

existing FD facilities in an area of the base more conducive to the conduct of FD operations. This would result in fewer cumulative impacts than would occur under the No-Action Alternative, for which there would be cumulative impacts in conjunction with other operations in the northwestern area of the ramp and flight line.

Given the limited area that would be occupied by the FD Facility, its discrete location, and its largely self-contained operations, the potential for significant cumulative impacts from the Proposed Action is small. Cumulative effects resulting from the Proposed Action in conjunction with other past, present, and foreseeable future actions are anticipated to be minimal for all environmental resources. Cumulative effects from the Proposed Action in conjunction with ongoing operations and maintenance on the base were considered in the evaluation of consequences for each resource in Chapter 4. Accordingly, it is expected that cumulative adverse impacts would not be significant.

5.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible commitments of resources are those that essentially cannot be reversed, such as the extinction of a species or the consumption of fossil fuels. Irretrievable commitments of resources are those that are lost for a period of time, but that may be recoverable over the long term, such as the cutting of a pine plantation.

In that they assume the continuation of Shaw AFB, its missions, and associated operations, irreversible and irretrievable commitments of resources would be similar under the Proposed Action and the No-Action Alternative. Both would result in the irreversible commitment of certain natural resources; for example, timber and minerals for construction, natural gas for heating, and petroleum for aircraft and other fuels. Both would also involve irretrievable commitments of natural resources as a result of the displacement of natural habitats, wildlife, and ecosystems that occurred during the initial establishment of the base, its ongoing development, and under the Proposed Action, the clearing of a small area of pine forest.

Under the Proposed Action, construction of the FD Facility would involve additional irreversible and irretrievable commitments of natural resources, labor, materials, and fiscal resources beyond those that would occur under the No-Action Alternative. However, these incremental resource commitments would not be significant.

In areas of construction and paving, the land would be converted from its current uses to uses such as buildings, aprons, parking lots, and roadways. However, these areas are small in extent. Much of the area under the footprint of the Proposed Action has previously been developed as part of the airfield and the crosswind runway, thus minimizing irreversible and irretrievable commitments of natural resources. Use of the land under the proposed facility would be an irreversible commitment until or unless at some future time the structures and pavement are demolished (e.g., if a greater need for use of the land arises).

Labor and materials, such as fossil fuels and building materials, would be expended during implementation of the Proposed Action. Additionally, labor and natural resources would be used in the fabrication and preparation of construction materials. These resources generally would not be retrievable. However, these resources are not in short supply, and their commitment to the Proposed Action would not have an adverse effect on their availability. Fiscal resources also would be committed, as the proposed FD Facility also would require an irretrievable expenditure of federal funds.

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APPENDIX A
AGENCY COORDINATION

CONSULTATION LETTERS

DEPARTMENT OF THE AIR FORCE

20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

FEB 2 2 2005

MEMORANDUM FOR: Mr. Phil Degarmo
U.S. Fish and Wildlife Service Ecological Field Office
176 Croghan Spur Road, Suite 200
Charleston, SC 29407-7558

FROM: 20 CES/CEV
345 Cullen Street
Shaw AFB, SC 29152

SUBJECT: Environmental Assessment (EA) for a Fighter Detachment Facility at Shaw Air Force Base (AFB), South Carolina

The 20th Fighter Wing at Shaw AFB has prepared a Draft EA that evaluates the potential environmental impacts from a Proposed Action consisting of the construction of a Fighter Detachment Facility at Shaw AFB. Based on the results of the EA, a Finding of No Significant Impact (FONSI) was prepared.

This letter has been sent to you in accordance with the scoping process required by the Council on Environmental Quality regulations implementing the National Environmental Policy Act and for the purpose of interagency and intergovernmental coordination and notification for environmental planning. The United States Air Force invites you to review the attached copy of the EA and FONSI and provide any comments and concerns you may have regarding this Proposed Action.

Please transmit any comments to the EA Project Manager, Mr. Sam Johnson, at the above address, at (803) 895-9999, or at samuel.johnson@shaw.af.mil. We request that comments be submitted by 23 March 2005 in order for any needed changes to be included in the Final EA.

Thank you for your consideration.

GARY COX
Environmental Flight Chief

Attachment:
1. Draft Fighter Detachment EA

DEPARTMENT OF THE AIR FORCE

20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

FEB 2 2 2005

MEMORANDUM FOR: Mr. Sam Hamilton
U.S. Fish and Wildlife Service Regional Office
1875 Century Boulevard
Atlanta, GA 30345

FROM: 20 CES/CEV
345 Cullen Street
Shaw AFB, SC 29152

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Thank you for your consideration.

R. MARSHALL DIXON, GM-13
Environmental Flight Chief

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1. Draft Fighter Detachment EA

Global Power For America

DEPARTMENT OF THE AIR FORCE

20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

FEB 2 2 2005

MEMORANDUM FOR: Ms. Julie Holling, Data Manager
South Carolina Department of Natural Resources
P.O. Box 167, Rembert C. Dennis Building
Columbia, SC 29202

FROM: 20 CES/CEV
345 Cullen Street
Shaw AFB, SC 29152

SUBJECT: Environmental Assessment (EA) for a Fighter Detachment Facility at Shaw Air Force Base (AFB), South Carolina

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Please transmit any comments to the EA Project Manager, Mr. Sam Johnson, at the above address, at (803) 895-9999, or at samuel.johnson@shaw.af.mil. We request that comments be submitted by 23 March 2005 in order for any needed changes to be included in the Final EA.

Thank you for your consideration.

GARY COX
Environmental Flight Chief

Attachment:
1. Draft Fighter Detachment EA

DEPARTMENT OF THE AIR FORCE

20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

FEB 2 2 2005

MEMORANDUM FOR: Ms. Jean Manheimer
South Carolina State Clearinghouse
Office of State Budget
1201 Main Street, Suite 950
Columbia, SC 29201

FROM: 20 CES/CEV
345 Cullen Street
Shaw AFB, SC 29152

SUBJECT: Environmental Assessment (EA) for a Fighter Detachment Facility at Shaw Air Force Base (AFB), South Carolina

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GARY COX
Environmental Flight Chief

Attachment:
1. Draft Fighter Detachment EA

Global Power For America

DEPARTMENT OF THE AIR FORCE

20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

FEB 2 2 2005

MEMORANDUM FOR: South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, SC 29201

FROM: 20 CES/CEV
345 Cullen Street
Shaw AFB, SC 29152

SUBJECT: Environmental Assessment (EA) for a Fighter Detachment Facility at Shaw Air Force Base (AFB), South Carolina

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GARY COX
Environmental Flight Chief

Attachment:
1. Draft Fighter Detachment EA

DEPARTMENT OF THE AIR FORCE

20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

FEB 2 2 2005

MEMORANDUM FOR: Ms. Valerie Marcil
South Carolina State Historic Preservation Office
8301 Parklane Rd.
Columbia, SC 29223

FROM: 20 CES/CEV
345 Cullen Street
Shaw AFB, SC 29152

SUBJECT: Environmental Assessment (EA) for a Fighter Detachment Facility at Shaw Air Force Base (AFB), South Carolina

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Thank you for your consideration.

R. Marshall Dixon

R. MARSHALL DIXON, GM-13
Environmental Flight Chief

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1. Draft Fighter Detachment EA

Global Power For America

DEPARTMENT OF THE AIR FORCE

20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

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South Carolina State Historic Preservation Office
8301 Parklane Rd.
Columbia, SC 29223

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R. Marshall Dixon

R. MARSHALL DIXON, GM-13
Environmental Flight Chief

Attachment:
1. Draft Fighter Detachment EA

DEPARTMENT OF THE AIR FORCE

20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

FEB 2 2 2005

MEMORANDUM FOR: Honorable Joseph T. McElveen, Mayor
City of Sumter
P.O. Box 1449
Sumter, SC 29251-1449

FROM: 20 CES/CEV
345 Cullen Street
Shaw AFB, SC 29152

SUBJECT: Environmental Assessment (EA) for a Fighter Detachment Facility at Shaw Air Force Base (AFB), South Carolina

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GARY COX
Environmental Flight Chief

Attachment:
1. Draft Fighter Detachment EA

Global Power For America

DEPARTMENT OF THE AIR FORCE

20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

FEB 2 2 2005

MEMORANDUM FOR: Ms. Naomi Sanders, Chairwoman
Sumter County Council
13 East Canal Street
Sumter, SC 29150

FROM: 20 CES/CEV
345 Cullen Street
Shaw AFB, SC 29152

SUBJECT: Environmental Assessment (EA) for a Fighter Detachment Facility at Shaw Air Force Base (AFB), South Carolina

The 20th Fighter Wing at Shaw AFB has prepared a Draft EA that evaluates the potential environmental impacts from a Proposed Action consisting of the construction of a Fighter Detachment Facility at Shaw AFB. Based on the results of the EA, a Finding of No Significant Impact (FONSI) was prepared.

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GARY COX
Environmental Flight Chief

Attachment:
1. Draft Fighter Detachment EA

Global Power For America

DEPARTMENT OF THE AIR FORCE

20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

FEB 2 2 2005

MEMORANDUM FOR: Dr Wenonah Haire, THPO
Catawba Indian Tribe
P.O. Box 750
Rock Hill, SC 29731

FROM: 20 CES/CEV
345 Cullen Street
Shaw AFB, SC 29152

SUBJECT: Environmental Assessment (EA) for a Fighter Detachment Facility at Shaw Air Force Base (AFB), South Carolina

The 20th Fighter Wing at Shaw AFB has prepared a Draft EA that evaluates the potential environmental impacts from a Proposed Action consisting of the construction of a Fighter Detachment Facility at Shaw AFB. Based on the results of the EA, a Finding of No Significant Impact (FONSI) was prepared.

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GARY COX
Environmental Flight Chief

Attachment:
1. Draft Fighter Detachment EA

Global Power For America

DEPARTMENT OF THE AIR FORCE

20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

FEB 22 2005

MEMORANDUM FOR: Ms. Faith A. Line, Director
Sumter County Library
111 North Harvin Street
Sumter, SC 29150-4688

FROM: 20 CES/CEV
345 Cullen Street
Shaw AFB, SC 29152

SUBJECT: Environmental Assessment (EA) for a Fighter Detachment Facility at Shaw Air Force Base (AFB), South Carolina

The 20th Fighter Wing at Shaw AFB has prepared a Draft EA that evaluates the potential environmental impacts from a Proposed Action consisting of the construction of a Fighter Detachment Facility at Shaw AFB. Based on the results of the EA, a Finding of No Significant Impact (FONSI) was prepared.

This letter has been sent to you as part of the public comment process. The United States Air Force requests that you make the attached copy of the EA and FONSI available at your library for review by the interested public. A public notice has been published in the 20 February 2005 edition of the Sumter Daily Item newspaper stating that a copy of the EA and FONSI will be available 22 February 2005 at your library and identifying how the public can comment. We request that you make the EA and FONSI available to the public through 23 March 2005.

Please contact the EA Project Manager, Mr. Sam Johnson, at the above address, at (803) 895-9999, or at samuel.johnson@shaw.af.mil with any questions.

Thank you for your assistance.

GARY COX
Environmental Flight Chief

Attachment:
1. Draft Fighter Detachment EA

Global Power For America

AGENCY COMMENTS ON DRAFT EA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
176 Croghan Spur Road, Suite 200
Charleston, South Carolina 29407

March 2, 2005

Mr. Gary Cox
Environmental Flight Chief
20 CES/CEV
345 Cullen Street
Shaw AFB, SC 29152

Dear Mr. Cox:

The Fish and Wildlife Service (Service) has reviewed the Draft Environmental Assessment (DEA) and Finding of No Significant Impact for the United States Air Force proposed construction of a Fighter Detachment Facility at Shaw Air Force Base, Sumter County, South Carolina. These comments are submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and Section 7 of the Endangered Species Act, as amended (16 U.S.C. 1531-1543).

The DEA adequately describes the existing fish and wildlife resources in the project area and adequately evaluates the project impacts. It is our opinion that the proposed action is not likely to have reasonably foreseeable adverse effects on resources under the jurisdiction of the Service that are currently protected by the Endangered Species Act. Therefore, no further action is required under Section 7(a)(2) of the Act.

We appreciate the opportunity to review this project.

Sincerely,

Timothy N. Hall
Field Supervisor

TNH/EME

South Carolina Department of
Natural Resources

John E. Frampton
Director

March 21, 2005

Mr. Gary Cox
Environmental Flight Chief
20 CES/CEV
345 Cullen Street
Shaw AFB, SC 29152

REF: Environmental Assessment (EA) for a Fighter Detachment Facility at Shaw Air Force Base (AFB); Sumter County

Dear Mr. Cox:

Personnel with the South Carolina Department of Natural Resources have reviewed the Environmental Assessment (EA) document, evaluated the projects impact on natural resources and offer the following comments.

The proposed work will include converting a temporary Fighter Detachment (FD) facility to a permanent FD facility in order to better fulfill the base's mission requirements.

We believe that the proposed work can be accomplished with minimal impacts to natural resources and we do not offer any objections. We appreciate the opportunity to review the proposed project and provide these comments.

Sincerely,

Robert E. Duncan
Environmental Programs Director

red/lr

cc: Quinton Epps – SCDHEC
Kacy Campbell – USEPA
Jason Ayers – USFWS

STATE OF SOUTH CAROLINA
State Budget and Control Board
OFFICE OF STATE BUDGET

MARK SANFORD, CHAIRMAN
GOVERNOR

GRADY L. PATTERSON, JR.
STATE TREASURER

RICHARD ECKSTROM
COMPTROLLER GENERAL

HUGH K. LEATHERMAN, SR.
CHAIRMAN, SENATE FINANCE COMMITTEE

ROBERT W. HARRELL, JR.
CHAIRMAN, WAYS AND MEANS COMMITTEE

FRANK W. FUSCO
EXECUTIVE DIRECTOR

1201 Main Street, Suite 950
COLUMBIA, SOUTH CAROLINA 29201
(803) 734-2280

LES BOLES
DIRECTOR

March 14, 2005

Gary Cox
Department of the Air Force
20th Fighter Wing (ACC)
20 CES/CEV
345 Cullen Street
Shaw AFB, SC 29152

Project Name: Environmental Assessment (EA) for a Fighter Detachment Facility at Shaw Air Force Base (AFB), SC

State Application Identifier: SC050203-191

Dear Chief Cox:

The State Clearinghouse, Office of State Budget, has conducted an intergovernmental review of the project referenced above as provided by Presidential Executive Order 12372. All comments received, if any, as a result of the review are enclosed for your information.

The Clearinghouse does not have information on the Federal agency's review status. Please contact your Federal grantor agency with any questions concerning the status of your application.

The State Application Identifier indicated above should be used in any future correspondence with this office.

Sincerely,

Jean Manheimer

Jean Manheimer-Ricard
Fiscal Manager, Grant Services

BOARD:
Elizabeth M. Hagood
Chairman

Mark B. Kent
Vice Chairman

Howard L. Brilliant, MD
Secretary

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

BOARD:
Carl L. Brazell

Louisiana W. Wright

L. Michael Blackmon

Coleman F. Buckhouse, MD

March 1, 2005

Mr. Sam Johnson
20 CES/CEV
345 Cullen Street
Shaw Air Force Base, South Carolina 29152

Re: Proposed Fighter Detachment Facility

Dear Mr. Johnson:

We have received your draft environmental assessment regarding the proposed construction of a Fighter Detachment Facility at Shaw Air Force Base. You requested that the South Carolina Department of Health and Environmental Control review the proposal and provide input.

Currently, Sumter County meets all national ambient air quality standards; therefore this project is not subject to a conformity analysis. However, all other necessary environmental permits for the project must be obtained in accordance with applicable State and Federal regulations. The proposal indicates the study area contains various water resources and hazardous materials. If you have not already done so, please contact the Bureau of Water and the Bureau of Land and Waste Management for input regarding those program areas' assessments of this proposed project.

Thank you for the opportunity to comment on this project. Should you have any further questions or comments concerning this matter, please contact Tonya Lott at (803) 898-4291.

Sincerely,

Henry Phillips, Manager
Air Assessment and Planning Section
Bureau of Air Quality

South Carolina Archives & History Center

History & Heritage For All Generations

March 18, 2005

Mr. Sam Johnson
20 CES/CEV
345 Cullen Street
Shaw AFB, SC 29152

RE: Draft Environmental Assessment and FONSI, Fighter Detachment Facility, Shaw AFB, Sumter, SC

Dear Mr. Johnson:

We have reviewed the above referenced Draft Environmental Assessment (EA). We concur with the findings of the EA that historic properties will not be affected by the project as proposed.

These comments are being provided to assist you with your responsibilities under the pertinent state and federal laws. I can be contacted at (803) 896-6173 if you have any questions or comments regarding this matter.

Sincerely,

Valerie Marcil
Staff Archaeologist
State Historic Preservation Office

18 March 2005

20 CES/CEV
345 Cullen Street
Shaw AFB, South Carolina, 29152

RE: THPO #	**Project #**	Project Description and location
2005-135-1	Not available	**Environmental Assessment for Fighter Detachment Facility at Shaw Air Force Base, SC**

Dear Sir,

This letter is acknowledgement of receipt of your request dated 22 February 2005 for comments on a draft Environmental Assessment for a Fighter Detachment Facility at Shaw Air Force Base, South Carolina. We will send you the information you have requested as soon as our review process has been completed.

While the State Historic Preservation Officer is required by National Historic Preservation Act to respond to requests such as yours within thirty days, Federally recognized Indian Tribes are under no such obligation. Nor does lack of response within your timeframe constitute Tribal assent to this project.

If you have questions, please feel free to contact our office at 803-328-2427, Sandra Reinhardt, ext. 233; sandrar@ccppcrafts.com.

Sincerely,

Sandra Reinhardt

for Wenonah G. Haire
Tribal Historic Preservation Officer

cc: Gilbert Blue, Chief, Catawba Indian Nation
Executive Committee, Catawba Indian Nation
John E. George, Traditional Medicine, Catawba Indian Nation

WGH/ssr

APPENDIX B
DISPERSION MODELING OF CONSTRUCTION-RELATED AIR EMISSIONS

Appendix B

Dispersion Modeling of Construction-Related Air Emissions

Introduction

A simple dispersion model was used to provide an approximate measure of impact to the air shed over the base resulting from construction-related air emissions. The impact of construction emissions is expected to be small because of the relatively small size of the FD Facility. Because internal combustion engines from construction equipment are the major source of emissions and the dispersion model is conservative, only internal combustion engine emissions were modeled.

The model is based upon events occurring within an atmospheric box as depicted in Figure 1.

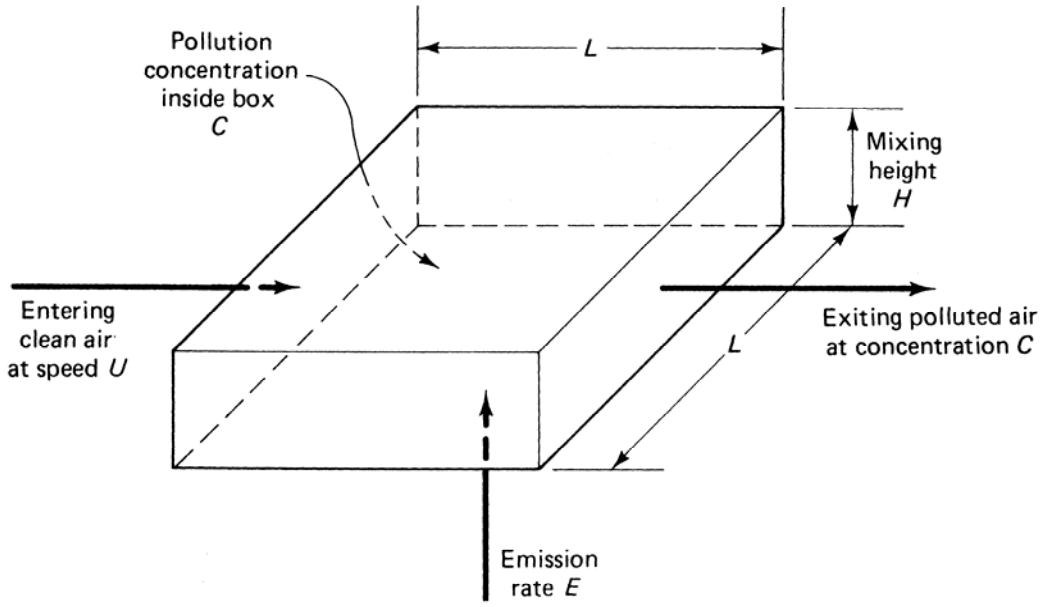

Figure 1: Dispersion Model Used in Air Quality Analysis

The box model may be used to estimate the concentration of air pollution C within an atmospheric volume defined by a rectangular area L by L and a mixing height H. Pollutants are emitted into the box at a constant rate E, and clean air enters the box at a speed U. The basic equation of the model is:

$$C = \frac{E}{ULH}$$

Meteorological Data

Wind speed and mixing height are needed for the model. Meteorological data were obtained from the USEPA Support Center for Regulatory Air Models (SCRAM) website (located at www.epa.gov/scram001/tt24.htm). SCRAM Mixing Height Station 13723 in Greensboro, North Carolina, was selected as a representative location. (The only mixing height station available for South Carolina is located at Charleston; the Greensboro station, although it has less favorable meteorological conditions than those found at Shaw AFB, better represents conditions in the Shaw AFB area.) The average a.m. (i.e., morning) mixing height of approximately 400 meters and wind speed of 9,360 meters per hour were selected as representative worst case mixing height and wind speed.

Box Geometry

A 20,000 meter by 20,000 meter square encloses the base. A mixing height of 400 meters was used.

Compression Combustion Engines

The quantity, type, and size engines needed to be determined. It was assumed that the representative equivalent diesel engine would be a Tier 2 engine in the 100 to 175 horsepower class.

The quantity of engines was estimated by first estimating the maximum number of engines that would be running at the same time on the construction project.

Emission factors listed in Table 1 were obtained from Tables 3, 4, 5, and 6 of *Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling--Compression-Ignition.* EPA420-P-04-009, NR-009c, EPA, Revised April 2004.

Table 1: Emission Factors

Pollutant	**Rate (g/hp-hr)**
HC	0.3384
CO	0.8667
NO_x	4.0
PM_{10}	0.18

Calculations

The basic equation used to calculate the concentration of each pollutant was:

$$C = \frac{E}{ULH} = \frac{E}{(20{,}000)(400)(9{,}360)} = \frac{E}{74{,}880{,}000{,}000}$$

The emission factor *E* (in g/hr) was calculated as the product of the emission factor from Table 1 (in g/hp-hr/engine), engine horsepower, and the number of engines running. E was then substituted into the equation above to calculate C (in mg/m^3). This calculation for each of the four pollutants is shown in Table 2.

Table 2: Calculation of Pollutant Concentrations

Pollutant	Emission Factor (g/hp-hr/engine)	*times*	Engine Horsepower (assumed 137 hp)	*times*	Number of Engines (assumed 6)	*equals*	E (g/hr)	C (mg/m^3)
HC	0.3384	*x*	137	*x*	6	=	278	0.37e-8
CO	0.8667	*x*	137	*x*	6	=	712	0.95e-8
NO_x	4.0	*x*	137	*x*	6	=	3,288	4.39e-8
PM_{10}	0.18	*x*	137	*x*	6	=	148	0.20e-8

The pollutant concentrations C in Table 2 are well below the federal and state standards. These results were obtained with a simple but valid model based on several conservative assumptions.